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Aims and Scope
IFLA Journal is an international journal publishing peer reviewed articles on library and information
services and the social, political and economic issues that impact access to information through libraries.
The Journal publishes research, case studies and essays that reflect the broad spectrum of the profession
internationally. To submit an article to IFLA Journal please visit: journals.sagepub.com/home/ifl
This issue of IFLA Journal presents a collection of scholarly articles that address the multifaceted roles of libraries in the contemporary world. These articles can be organized into four thematic categories: Libraries as facilitators of knowledge dialogue and cultural exchange; Libraries and the impact of technology on literacies; The challenges and opportunities facing libraries in the face of climate change, disasters, and the ongoing impacts of the COVID-19 pandemic; and Fostering inclusivity and addressing the gender gap. Overall, this issue reflects the diversity of library contexts and practices across the globe, with contributions from authors based in Africa, Asia, Europe, and North America.

Libraries as Facilitators of Knowledge Dialogue and Cultural Exchange

Mariano (2024) explores the nuanced roles of US libraries in international diplomacy, identifying strategies that promote cultural humility and knowledge exchange. Chigwada and Ngulube (2024) discuss the ethical preservation and dissemination of indigenous knowledge, emphasizing the importance of collaboration with indigenous communities.

Libraries and the Impact of Technology on Literacies

Zou et al. (2024) investigate the impact of AI-generated content tools on students’ critical thinking, highlighting the need for AI literacy and critical thinking education in libraries. Ramgadwala (2024) examines the influence of multimedia on academic information literacy instruction, advocating for diverse pedagogical approaches. Tolare, Fujita, and Castro (2024) analyze the representation and retrieval of musical scores in digital environments, calling for improved professional training and system organization.

The Challenges and Opportunities Facing Libraries in the Face of Climate Change, Disasters, and the Ongoing Impacts of the COVID-19 Pandemic

Fombad (2024) proposes a knowledge management strategy for climate change in South Africa, emphasizing the role of knowledge in climate adaptation and mitigation. Superio et al. (2024) assess the disaster preparedness of libraries in the Philippines, underscoring the need for comprehensive disaster management plans. Ofori (2024) explores the potential for telecommuting among academic librarians in Ghana post-COVID-19, reflecting on the changing nature of library work.

Fostering Inclusivity and Addressing the Gender Gap

Dora et al. (2024) analyze the gender gap in LIS doctoral research in India, highlighting the need for equitable opportunities and representation. Eltemasi and Arami (2024) explore the influence of humble leadership on knowledge sharing and adaptability in Iranian public libraries, considering the impact of ethnic diversity.

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Understanding US library diplomacy practices in the 21st century

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Abstract
This exploratory case study delves into the views and perspectives of 17 US library experts involved in 21st-century library diplomacy practices. Using the template analysis, four main themes of library diplomacy are identified: (1) the actors showed implicit and explicit roles in diplomatic involvement; (2) the main objective of library diplomacy was to facilitate knowledge dialogue; (3) the strategies aimed to foster cultural humility; and (4) the actors viewed digitalization as a significant instrument in international library work. This research offers significant insights into the less explored topic of library diplomacy, particularly when 21st-century libraries are challenged concerning global issues relating to freedom of information; the values of equity, diversity, inclusion and accessibility; and sustainability efforts. Library diplomacy is more critical than ever to be at the forefront of establishing dialogue around the world. The study encourages further investigation of library diplomacy practices in a variety of geographical and international contexts.

Keywords
Library diplomacy, international librarianship, comparative librarianship, principles of library and information science, global perspectives

Introduction
Library diplomacy, though not a new concept, has witnessed growing interest and discussion among scholars studying the role of soft power and cultural diplomacy in the field of library and information science (LIS; Bell and Kennan, 2022; Mariano, 2022; Mariano and Vårheim, 2021). Library diplomacy is characterized by the role of library actors at individual, institutional, national and international levels in establishing international relations, influencing global policy decisions, and bridging understanding between and among various institutions and countries. This can be achieved by leveraging library resources and programmes as soft-power assets, cultural diplomacy instruments or cross-cultural mediators to bring together and connect diverse actors, institutions and communities in the international arena. Soft-power diplomacy is one of the mainstream diplomatic strategies of state and non-state actors in the 21st century. It shapes preferences and influences the international community by attracting the global public through culture, values and ideals, utilizing galleries, libraries, archives and museums (Bell, 2022; Mariano, 2021, 2022; Nye, 2004, 2021). In the USA, libraries have traditionally been used as instruments for government and non-governmental institutions to build relations and influence foreign public opinion (Barnhisel and Turner, 2010; Chambers, 2016; Laugesen, 2019; Snow and Cull, 2020; Witt, 2014b). Libraries have served as tools for furthering US foreign policies and disseminating American culture and liberal values such as peace and democratic ideals, particularly during the Second World War and Cold War periods, using resources such as reading rooms, books, magazines and cultural programmes (Becker, 2004; Cull, 2008; Laugesen, 2010; Maack, 2001; Prieto, 2013; Richards, 2001; Robbins, 2007). American librarians and professional library associations also spearheaded 20th-century library modernization initiatives (Laugesen, 2019; Richards, 2001) and established
international library standards, international partnerships and networks to help improve libraries worldwide (Kraske, 1985; Lee and Bolt, 2016; Lor, 2019; Mattson and Hickok, 2018; Munson and Thompson, 2018; Witt, 2014a).

The early 21st century presents escalating global challenges like information warfare and related issues of disinformation (Jankowicz, 2020; Stengel, 2019), computational and digital propaganda (Oxford Internet Institute, 2023), and the influx of post-truth narratives and alternative facts, such as the COVID-19 infodemic crises (Walker, 2021). These information challenges pose significant disruptions to local and global public views of knowledge, information and factual realities in the digital sphere (Bjola et al., 2019; Manor, 2019). Science cooperation, the scientific diaspora and science diplomacy strategies are also facing challenges in fostering scientific knowledge in the 21st century. These global challenges stem from economic trade wars, disputes over intellectual property rights and threats to information security (Prieto and Scott, 2022; The Royal Society, 2010). These issues are not only confined to the USA, but are also prevalent worldwide, particularly given the significant involvement of other global and regional powers such as China and Russia (Blank, 2022; Vuletić and Stanoević, 2022).

Similarly, US libraries and the American Library Association’s core values of librarianship have also been challenged by recent incidents, such as the banning of books and information censorship in US school libraries, coupled with the spread of disinformation, misinformation and mal-information within US digital communities (Harris and Alter, 2022). In response, the American Library Association (2023) has taken strategic actions by releasing practical resources, tool kits and data addressing the COVID-19 pandemic crisis, tools for combating fake news and post-truth narratives, resources related to artificial intelligence, and guidelines for handling the censorship of library resources. US libraries and the library profession are not siloed from these international challenges, underlining the importance of library diplomacy today more than ever. In library diplomacy, it is crucial for libraries to create a strong presence in international policies, facilitate dialogue and devise solutions to these global challenges.

This study on the present understanding of library diplomacy and its connection to international and global engagement calls for an empirical analysis to examine the roles various actors play, including their goals, strategies and instruments, in the international sphere. The article aims to identify the key characteristics of library diplomacy practices in the USA and investigate how US library experts from government and non-governmental institutions engage and shape library diplomacy. The research also aims to develop the library diplomacy concept for further exploration.

The following research questions are addressed:

1. How is library diplomacy being practised and used in the USA in the early 21st century?
2. How do the actors’ practices from both government and non-governmental institutions shape the roles, goals, strategies and instruments of library diplomacy and international engagement?
3. What are the key and emerging characteristics of US library diplomacy practices?

Libraries and diplomacy

Libraries and international relations have been comprehensively studied in the fields of LIS and political science. Libraries have been linked to concepts and theories of library internationalism (Laugesen, 2019: 167; Lor, 2019: 58), cultural internationalism (Lor, 2019: 526; Witt, 2014a: 506, 2014b: 276), cultural diplomacy and foreign cultural relations (Cummings, 2003: 1, 3; Melissen, 2005: 21–22), public diplomacy (Cull, 2008: 9, 11; Maack, 2001: 59), soft power (Bell, 2022: 1458; Bell and Kennan, 2022: 707), the internationalization of LIS education, and the discourses around international librarianship and international partnerships (Carroll et al., 2001; Lee and Bolt, 2016; Lor, 2008, 2019; Mattson and Hickok, 2018). Most of the research data and researchers’ interests have mainly focused on the US context in the 20th century, with a qualitative focus on historical and textual studies, and few quantitative and theoretical studies (Mariano and Várheim, 2021: 657).

During the 20th century, the US government developed various diplomatic initiatives and foreign policies concerning the dissemination of US libraries, and information programmes for the sole purpose of shaping foreign public opinion towards the USA. These key US foreign policies were the Creel Committee of 1917–1919; the Office of the Coordinator of Inter-American Affairs in 1940; the Office of War Information in 1942; the Smith–Mundt Act of 1948; the United States Information Agency in 1953; and the Fulbright–Hays Act of 1961 (Cull, 2008; Elder, 1967; Maack, 2001; Melissen, 2005; Richards, 2001). The USA’s foreign policy goals were focused on fostering relationships by promoting liberal values and ideals like peace and democracy through different forms of media such as books, pamphlets, newspapers, films and radio broadcasting, and through reading and
information programmes (Dalton, 2007; Laugesen, 2010; Maack, 2001; Makinen, 2001; Mokia, 1995; Morinaka, 2019; Prieto, 2013; Richards, 2001), cultural and aid programmes supporting English-language learning, and educational and facilitating library exchange activities (Glant, 2016; Guth, 2008; Richards, 2001; Robbins, 2007).

US non-governmental institutions like the Carnegie Endowment for International Peace and the American Library Association have similarly played significant roles in establishing book programmes and collections aimed at fostering global understanding through peace and cultural initiatives (Witt, 2014b). American representatives to UNESCO and individual library advocates championed the American model of librarianship, contributing to the world’s library modernization initiatives, such as bibliographic programmes and interlibrary loan activities to improve education globally (Kraske, 1985; Laugesen, 2019; (Price, 1982). The American Library Association’s American Library in Paris initiative – École des bibliothécaires – is one of the few examples of how the USA has influenced international LIS curricula (The American Library in Paris, 2020; Carroll et al., 2001; Chapuis, 2021; Maack, 2007; Witt, 2014a).

Most of the 20th-century literature describing the library diplomacy efforts of government and non-governmental actors has contributed to a one-way cultural relationship and monocultural influence towards other countries to shape foreign public opinion in favour of US national interests. These efforts were often associated with issues such as the Cold War information warfare, cultural propaganda and cultural imperialism (Chambers, 2016; Guth, 2008; Laugesen, 2010, 2019; Maack, 2001; Prieto, 2013; Richards, 2001; Witt, 2014b).

The end of the 20th century marked a significant change in US library diplomacy. The United States Information Agency was abolished and incorporated into the US Department of State through the Foreign Affairs Reform and Reconstructing Act of 1998. The decline in the US government’s support for cultural diplomacy programmes triggered a decrease in, and the closure of, most US libraries, reading rooms and cultural centres overseas. Only a few surviving libraries were rebranded as Information Resource Centers, located within US embassies and consulates. The rebranded centres replaced books with computers and prioritized digital resources such as e-books, e-journals and other virtual tools in a bid to join the Internet revolution that marks the information age of public diplomacy (Cain, 2010; Cull, 2012; Melissen, 2005; Simmons, 2005).

Libraries, knowledge and information continue to shape global communities and influence international discourses. However, the identities of the emerging actors and their goals, strategies and instruments in library diplomacy remain underexplored. In fact, library diplomacy has been less researched by LIS scholars interested in international and global librarianship than its other cultural institution counterparts, such as museum diplomacy and heritage diplomacy, particularly over the last decade (Mariano and Vårheim, 2021). Moreover, fields related to library diplomacy – including data diplomacy (Boyd et al., 2019), knowledge diplomacy (Knight, 2023), digital diplomacy (Bjola et al., 2019; Manor, 2019), and the theoretical dimensions and variations of international library partnerships – have also been understudied. These areas of research interest point to the need for further investigations to deepen understanding of the concept and practice of library diplomacy, particularly in the 21st century (Mariano, 2022; Mariano and Vårheim, 2021).

Methodology

This research utilized an exploratory case study as a qualitative research method to delve deeper into the practices of library experts from government and non-governmental institutions in the USA, specifically focusing on the concept of library diplomacy in the early 21st century. Yin (2018: 15) defines a case study as an ‘empirical inquiry to investigate a particular contemporary phenomenon within its real-life context’, specifically when the phenomenon and its context, including their interconnections, remain underexplored. Exploratory case studies commonly pose ‘how’ and ‘what’ questions to examine evidence derived from documents, observations and interviews. This type of case study can be melded together with different analytical research methods, including template and thematic analysis, and theoretical frameworks, such as practice theory, to capture a systematic and in-depth understanding of the phenomenon (Braun and Clarke, 2022; King and Brooks, 2017; Ritchie et al., 2013; Yin, 2018).

Practice theory, which is related to the constructivist theoretical approach, is a social theory emphasizing the fundamental role of ideas, norms and identities in shaping the social world (Wendt, 1992). Practice theory, in the field of international relations and diplomacy, highlights the importance of practices, norms and patterns in attributing meaning to practitioners’ actions (Adler and Pouliot, 2011). Pouliot and Cornut (2015) further describe that practice theory is used by international relations scholars as a theory–method package to empirically interpret practitioners’ actions within their social contexts. Several studies that have incorporated
practice theory have used ‘how’ questions to illuminate practices and issues through the lens of the actors involved (Pouliot and Cornut, 2015: 305).

**Procedure**

This research employed interviews as the primary source of empirical data in order to gain an in-depth understanding of the actors’ involvement in library diplomacy and international library work in the early 21st century. The interview data was used to identify socially recognizable patterns in the real-world experiences of the library diplomacy experts (Pouliot and Cornut, 2015). The expert interviews were conducted with the aim of triangulating and cross-validating associated systematic reviews, theoretical papers and conceptual perspectives published on the concept of library diplomacy.

The individual semi-structured interviews were conducted online from 4 April 2022 to 2 March 2023. Initially, the research had scheduled in-person interviews with experts in the USA. However, due to the COVID-19 pandemic, the interviewees opted for online interviews. Given the logistical challenges and travel restrictions between the USA and Europe, the researcher obtained approval from the UiT The Arctic University of Norway’s ethics committee and the Norwegian Centre for Research Data to conduct all of the interviews online. This was facilitated through the university’s approved software application (its Zoom account) and secure research data storage (its SharePoint account). The interview protocol and guide, which were used flexibly, covered the following topics:

- Understanding of and involvement in library diplomacy, international partnerships and international library engagement activities;
- Insights into and familiarity with current library practices concerning diplomacy and internationalization;
- Views on the concept of library diplomacy and its utilization in international library work and advocacy.

The study employed snowball or chain sampling, a form of purposive sampling, to gather rich and relevant data to address the research questions. This method involved identifying and recruiting expert interviewees in the field of international librarianship in the USA through a chain of referrals, starting with invited experts who met clear criteria and objectives (Ritchie et al., 2013). The initial pool of invited interviewees included 12 librarians and library advocates in the USA. They were selected based on their expertise and backgrounds with libraries in the context of diplomacy, international relations, international partnerships and global engagement. These experts were affiliated with government and non-governmental institutions in the USA. However, only eight confirmed their participation. Following the expert interview protocol, which allowed for the recommendation of additional experts in the field of study, five out of the initial eight interviewees identified 11 more experts for potential recruitment. Out of these 11, only nine confirmed their participation. The study comprises a total of 17 in-depth semi-structured interviews.

In the transcription phase, the interviewees were assigned pseudonyms corresponding to the first names of US presidents to ensure anonymity.

**Analysis**

In order to thoroughly understand US library diplomacy practices, this study employed Adler and Pouliot’s (2011) practice theory and incorporated a thematic framework derived from the recent systematic review by Mariano and Vårheim (2021). The framework outlines the four a priori themes utilized for this study:

1. **Actors**: the individuals, organizations or countries involved in communication and interaction with domestic and foreign publics, and playing an important role in shaping international activities and policies;
2. **Goals**: the motives, objectives and causal ideas that drive actors to advance international understanding and dialogue;
3. **Strategies**: the mechanisms and methods – such as dialogue, exchanges and negotiations – employed to achieve international policy objectives;
4. **Instruments**: various programmes and activities – ranging from exchange programmes to digital campaigns – used to accomplish goals and implement strategies.

All of the data was transcribed, coded and analysed using ‘template analysis’ – a form of thematic analysis employed in qualitative research. The template analysis, coupled with a broad thematic analysis technique, utilized hierarchical coding to identify patterns and themes within the textual data. This analysis method was chosen and integrated due to its openness and flexibility, allowing adjustments at each coding stage to capture and compare codebook templates, and subsequent clustering into meaningful themes. This research highlights the use of template analysis for its systematic and structured approach to
developing codebook templates, in contrast to broad thematic analysis, which exhibits less structural rigor (Braun and Clarke, 2022; Brooks et al., 2015; King and Brooks, 2017).

The key themes identified through the a priori themes were (1) actors, (2) goals, (3) strategies and (4) instruments. The empirical data was classified and clustered into various levels of themes, subthemes and in-vivo codes. The template analysis was executed in three stages of codebook templates to systematically capture the patterns and meanings using NVivo Mac version 1.7.1 (Nvivo version 1.7.1 Qualitative data analysis software, 2020). The first template was then compared with the second, and the second with the third, which produced the final template that identified key significant themes. As the principal investigator, the researcher solicited the aid of his supervisor to validate and critically review the codebook templates, thereby ensuring that the thematic structure accurately reflected the empirical data.

Findings

This section organizes the results of the expert interviews into four main sections based on the a priori themes: (1) actors, (2) goals, (3) strategies and (4) instruments. Within these a priori themes, several subthemes and four major themes emerged, which are described and substantiated with selected quotes from the data collected. From the 23 library experts invited to participate in the study, with specializations in international librarianship, international partnerships, diplomacy and global engagement within the US context, 17 contributed, offering valuable insights on the present scenario of library diplomacy. These experts were affiliated with diverse sectors, such as the federal and state governments, professional organizations, academic and research institutes, non-profit organizations, the corporate sector and public–private agencies, revealing their engagement at the individual, institutional, national and international levels. These experts reported interaction with a wide array of library users and collaborators, from college students, young professionals, librarians, entrepreneurs and diplomats to refugees, indigenous peoples and diaspora communities.

**Actors**

This section explores the various roles of individual, organizational and nation-state actors – namely, policy and advocacy roles, individual and institutional partnership roles, and community and public engagement roles (see Table 1).

**Policy and advocacy roles.** This subtheme draws attention to the engagement of librarians, institutions and countries in international issues and processes shaping global policies. The interviewees emphasized their roles as policy consultants and advocates, with actors from government, academic and non-governmental institutions contributing to US foreign policies and international policy initiatives. Federal employees like Barack and Joe, who worked at American Spaces, described their advisory and consultant roles in implementing US foreign policies in library diplomacy programmes suited to their host countries or institutions.² These American Spaces, formerly known as the United States Information Agency, Information Resource Centers and American Corners,
are currently the cultural diplomacy extension of the Department of State, with over 600 libraries established worldwide. Bill and Ronald underscored their capacity-building roles in empowering libraries to thrive in the changing information environment. Ronald pointed out the significance of fostering capacity development to have a level playing field, where everyone can contribute and work together for better libraries. Similar to capacity-building roles, Calvin articulated the view that ‘librarians who work as a diplomat are deeply connected to their communities’. They listen and build relationships, ensuring they have a supportive library network that is ready to empower and advocate when challenges arise. Non-governmental actors (e.g. academic librarians and professional library association leaders) underlined their instrumental role in addressing global issues relevant to libraries, such as technological changes, copyright issues and freedom of information. John recalled his policy negotiation experience, creating dialogue and lobbying efforts around copyright policies at the World Intellectual Property Organization as an American Library Association delegate. Similar sentiments were expressed by Donald and Dwight with regard to librarians playing a proactive role in driving policy action forward in local, national and international arenas:

I think librarians can be diplomats. And then they can also help influence policy . . . I think that is a really important activity that librarians participate in [to] help drive how policy is formed at the local level, at the state level, and then at the national level. (Donald)

**Individual and institutional partnership roles.** This sub-theme examines the various actors engaged in partnerships and cooperation at an individual and an institutional level. The interviewees described partnerships that typically occur around international library projects, such as the international standardization of bibliographic access and documentation, interlibrary loan partnerships, and library exchange programmes between countries and institutions. Herbert reflected on his experience contributing to an institutional library partnership through librarian-to-librarian engagement. He pointed out that individual efforts to connect and meet international librarians at meetings, conferences and network gatherings can lead to international collaboration. He also highlighted the importance of respecting cultural norms, standards and values when entering into foreign partnerships. Jimmy discussed the role of libraries in institutional partnerships at universities, public libraries and professional associations aimed at improving user and technical services, such as bibliographic and interlibrary loan cooperation:

*[The] library diplomacy of my employer, the place where I work, whether it’s the city that I work in and its public library, or the university I went to work at in its academic library, there’s an interest in building relationships with counterparts around the world. And I’ve had experience working with a number of projects and programmes that have embraced institutional relationships so there’s interlibrary loan.*

Dwight commented on the role of librarians in mutual learning and knowledge exchange in a non-threatening environment. John, Herbert and Richard argued that libraries’ challenges with technical systems and technologies provide avenues for librarians to participate in and contribute to international library initiatives. Academic librarians like Jimmy and Harry suggested that certain library partnerships serve broader university objectives and internationalization efforts for teaching and research initiatives.

**Community and public engagement roles.** This sub-theme underscores the actors’ roles in community engagement, focusing on understanding audience needs. Public outreach and communication were seen to be key competencies among the librarians in both government and academic institutions. Government employees like Joe stressed the importance of their diplomacy and international communication backgrounds in engaging international communities with public outreach programmes. Academic librarians like Dwight highlighted their outreach skills, learned from their LIS education background, in offering their expertise to support the international needs of their community. Both Dwight and George underscored diplomatic listening skills for trust-building, and Dwight suggested that active listening and outreach skills enable librarians to extend their expertise to non-library collaborators, benefitting the institution they serve. Bill described the role of international library programmes in fostering shared cultural awareness, essential to understanding global societal concerns – for example, library programmes that promote the shared remembrance of genocide and collective memory initiatives to keep human rights alive. Bill and George described that by fostering cultural awareness, libraries facilitate knowledge exchange within library spaces, ensuring that library resources reach and empower the community:

The goal of any library is very similar to the goal of public diplomacy – to create that connection with
communities, that space for knowledge sharing for cultural awareness growing. So, informational, educational, cultural, it all is co-located into these spaces, whether they’re virtual spaces or physical spaces. (Bill)

While most of the experts acknowledged the lobbying efforts involved in public engagement, Jimmy and Calvin argued for librarians to learn public relations and lobbying as skills to help negotiate and influence the policies affecting them, and Harry pointed out that public relations and communication skills can help librarians become preferred partners for education and knowledge development within their institutions and communities.

Goals
Library diplomacy involves the development of international objectives and motivations to foster understanding and build relationships. The interviewees emphasized four key subthemes to describe their library diplomacy objectives: information freedom, copyright and open access; creativity and innovation; equity, diversity, inclusion and accessibility (EDIA); and sustainability (see Table 2).

Information freedom, copyright and open access. This subset of themes encompasses promoting policies related to information freedom, copyright, open-access initiatives, and the development of knowledge skills such as information literacy, creativity and critical thinking. Joe, Jimmy, Gerald and John highlighted library diplomacy’s role in international discussions surrounding the topic of copyright laws and intellectual freedom to safeguard both the interests of library users and the rights of knowledge creators. They underscored the librarian’s responsibility in navigating varying local copyright frameworks, striving to balance intellectual access and copyright compliance. Librarians are at the forefront of negotiating the library’s core information values to achieve mutual benefits for the library community: ‘Libraries need to be in those [international conference] discussions. They can’t just be discussing library to library. They need to be at the United Nations. They need to be at the World Intellectual Property’ (John).

Jimmy raised the importance of popularizing open-access initiatives within universities and research institutes. He emphasized the crucial role libraries play in managing and advocating for open educational resources and open-data research projects at the international level. Non-profit organizations such as the Scholarly Publishing and Academic Resources Coalition, an alliance advocating for open and equitable access to information, are actively working to dismantle academic siloes and connect library infrastructures in open knowledge creation and scholarship. Joe, Jimmy, Herbert and Dwight highlighted challenges to information access in the USA and abroad, pointing out instances of book banning in a few US schools and Internet-filtering incidents in several countries where American Spaces are hosted. Dwight noted that libraries and their core values are being challenged, particularly in upholding freedom of expression and democratic ideals:

I think our core values have not changed. But in some ways, they are challenged. And one good example is all the things that are going on with book banning. And some of these are international information that people don’t necessarily want shared. I think information sharing, valid information, has always been one of our values. We stand firm on that value.

Jimmy underscored that these issues are not exclusive to the USA but shared global challenges that require collaborative lobbying efforts among
countries and institutions. Herbert stressed the need for librarians to recognize international best practices and standards, especially when dealing with open-shelf and open-access policies.

Creativity and innovation. This subtheme describes the motivation to advance creativity and innovation in libraries. Government library experts like Joe and Barack expressed libraries’ goals of enhancing critical thinking and innovation among their users through exchanges and capacity development. They also highlighted libraries’ strategic shift towards prioritizing STEM (science, technology, engineering, mathematics) literacies, entrepreneurial skills and hands-on learning to empower the communities they serve. These science, innovation and entrepreneurship initiatives are supported to foster knowledge creation and sharing by using libraries for diplomatic engagement. Gerald also noted that diplomacy enables libraries to be engaged in global library solutions:

We facilitate librarians to identify a particular challenge, especially in knowing the other, you know, because we tend not to trust people who are different [from] the other. And so this particular process allowed us to share particular issues, invite librarians to find solutions, implement them in the engineering approach, then you evaluate, and you modify and improve.

EDIA. A key aspect of this subtheme revolves around fostering international understanding and broadening the world view of communities through libraries. These values address efforts to build dialogue with international students and diaspora and multiethnic communities in US local libraries, and engage with diverse advocacy groups such as women, LGBTQ+ (lesbian, gay, bisexual, transgender, queer, other) communities, non-governmental institutions, academia, researchers and think-tank policymakers in US libraries abroad. Librarians act as interlocutors in bridging EDIA objectives and shaping community and governmental perceptions about EDIA. Donald expressed the Department of State’s focus on aligning foreign policies with White House EDIA-themed programmes. Gerald, George, Jimmy and Dwight highlighted the American Library Association’s efforts to infuse EDIA objectives into US libraries, encouraging dialogue around EDIA values. Gerald recommended viewing library diplomacy beyond nation-state-level interactions, instead focusing on connections between libraries and communities – for instance, indigenous-to-indigenous based dialogue or women’s advocacy groups across borders through international library programmes. Gerald argued that the historical legacies of US colonialism, which contrasts with EDIA objectives, present limitations for contemporary US diplomatic engagement. Donald, George, and Ronald observed the role of English as a second language programmes in US libraries, locally and internationally, in connecting diverse groups such as new immigrants, refugees, young professionals and international students. They acknowledged that language barriers still exist, but expressed confidence in overcoming these through collaboration with English as a second language teachers and interpreters. Ronald believed that English-language learning still served as a soft-power tool and was an attractive asset of American Spaces programmes abroad, mainly in attracting young professionals and international students to study and live in the USA, but also as a means for new immigrants and refugees to share their cultural and knowledge backgrounds and be integrated into American society. However, George emphasized that utilizing English for advocacy abroad presents an EDIA challenge, as not everyone speaks the language. This can hinder the building of relationships and trust in multicultural and multilingual communities:

Language, of course, remains another challenge – making sure that we’ve got adequate resources for good conversations, right, whether that is interpreters or, you know, just that we were conscious of this. And I think that this is something that is going to be, you know, a challenge. That it’s hard for Americans sometimes, who don’t have a lot of experience outside of the States to remember that not everyone speaks English. (George)

For Gerald, the role of library programmes for new immigrants and refugees in offering educational or cultural programming support is essential to achieving EDIA. He stressed that libraries’ commitment to EDIA goals is pivotal in making their resources and spaces inclusive and welcoming, thereby broadening the community’s world view. Bill, Jimmy and Calvin shared the same sentiment that libraries be used as international engagement tools in giving voices to marginalized groups such as women and LGBTQ+ communities, especially in countries where gender-based discrimination is rife. They also shared that libraries help empower these communities to learn, share and contribute to broader EDIA initiatives.

Sustainability. This subtheme focuses on the United Nations’ Sustainable Development Goals and the objective of libraries to drive economically, socially and environmentally sustainable societies using knowledge and information. Gerald and Calvin
described Information Action Briefs, which are workshops that are designed to underscore libraries’ pivotal role in achieving the Sustainable Development Goals. The American Library Association has also initiated a task force committee to advance the Sustainable Development Goals at the domestic level within the USA: ‘They have formed a library sustainability group as part of the American Library Association’ (Calvin).

Calvin and Franklin voiced that the 16 Sustainable Development Goals serve as a unifying global framework, enabling librarians to connect and work together internationally. The Sustainable Development Goals also position libraries’ potential power to address economic, cultural, environmental and social issues. However, John and Warren identified a disconnect between librarians and Sustainable Development Goal policymakers, expressing concern that libraries are not fully part of Sustainable Development Goal discussions. For instance, libraries’ role in development is not included in the 248 Global Framework indicators and targets. Calvin highlighted the need for a diplomatic effort from international library networks and advocates to ensure the involvement of librarians in Sustainable Development Goal conversations, recognizing that knowledge and information are as essential as human rights. Warren also saw the need for more Sustainable Development Goal supporters within international library networks who can actively pursue the Sustainable Development Goals and incorporate them into library policies and programmes.

**Strategies**

This section identifies international processes and strategies to fulfil international understanding, encompassing dialogue, exchanges and negotiation. Four subthemes emerged: active listening; trusted profession and institution; local–global (glocal) perspective; and shared challenges and commitment (see Table 3).

### Table 3. Strategies.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Subthemes</th>
<th>In-vivo codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foster cultural humility</td>
<td>Active listening</td>
<td>Listening skills to meet the needs of the community (Dwight, George, Gerald, Richard)</td>
</tr>
<tr>
<td></td>
<td>Trusted profession and institution</td>
<td>Trusted people and a neutral zone (Donald, George)</td>
</tr>
<tr>
<td></td>
<td>Local–global (glocal) perspective</td>
<td>Awareness of local–global perspectives and practices (Dwight, George, Joe, John)</td>
</tr>
<tr>
<td></td>
<td>Shared challenges and commitment</td>
<td>Mutual commitment of libraries to address global issues (Bill, Franklin, Lyndon)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interdependence among libraries (Bill, Jimmy)</td>
</tr>
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</table>

**Active listening.** This subtheme draws attention to the listening strategies employed by library actors to engage in mutual understanding and dialogue with diverse communities. Dwight’s, George’s, Gerald’s and Richard’s insights revealed the role of active listening in fostering a non-threatening learning environment that is conducive to partnership. George and Gerald contextualized listening strategies, highlighting the need to identify the audience’s information behaviour and needs – for instance, their information literacy levels and interaction in the digital world. Dwight and Richard stressed that listening is essential for cultivating self-awareness of one’s cultural identity, and they also noted that imposing one’s cultural beliefs, attitudes and biases on others creates an environment that hinders understanding and dialogue:

> Our priorities were never to tell people how to do things or what was best, but rather to listen, and exchange ideas, and learn from the people that we were working with. (Dwight)

> I think that good librarians listen... they try [to] meet and have one-on-one relationships, and good librarians have that within their communities. (Richard)

**Trusted profession and institution.** This subtheme acknowledges the long-standing trust in libraries, including their collections, staff and spaces. George and Donald expressed that librarians earn trust in their community due to their neutrality and openness. Donald added that libraries, being safe and neutral zones, help bring people’s ideas together, thereby recognizing diverse viewpoints in the community. According to George: ‘I also think, just from a diplomacy standpoint, that no matter where you go in the world, librarians are really trusted people in communities, and libraries are trusted places’.

**Local–global (glocal) perspective.** This subtheme examines the merging of local and global perspectives – also
referred to as a glocal perspective – in building dialogue with diverse international communities. Dwight, George and Joe stated that the glocal approach is essential in building international library programmes that are appealing and relevant to both domestic and international audiences. They described that the multifaceted communities of the USA have prompted libraries to embrace local–global perspectives, catering either to those seeking access to internationally diverse collections at the library or to those wanting to engage with inclusive and diverse networks of indigenous and immigrant communities through library programmes. In the context of academic libraries, John expressed the significance of developing universities’ Area and Global Studies programmes, supporting the internationalization of universities. Joe added:

I also think that in the United States, for example, we are very fortunate to have very large populations of immigrants and refugees . . . the diversity of the United States and those communities’ influences on us really help us to become more aware of the outside world and be better connected with communities.

**Shared challenges and commitment.** This subtheme highlights the vital role of libraries as interlocutors in fostering a shared commitment to promote knowledge dissemination. Lyndon, Bill, George and Franklin discussed the mutual commitment of libraries to international collaboration in order to address global issues and challenges. Jimmy and Bill underscored shared objectives and the common challenges that motivate libraries to be interdependent and work together for common goals and actions. According to Lyndon:

> [It is a matter of] how we can bring our expertise to bear on a certain situation. And we work together. And that creates a sense of community, a sense of collaboration. And also a sense that this is, you know, shared knowledge as well, so people don’t just stay in their silos.

**Instruments**

This section identifies the common tools, instruments and platforms used in diplomacy and international engagement – namely, library programming (encompassing libraries’ user, technical and support services) and transitions to digitalization (see Table 4).

**Library programming.** This subtheme revolves around the various types of library services and programmes utilized by the USA as tools to facilitate diplomatic and international engagement with partnering institutions and countries abroad. These library programmes span various types of libraries, including federal and
state government libraries, public libraries, special libraries and academic libraries.

Different aspects of library programming, such as technical, user and support services, were revealed in the interview data. Dwight discussed the long-standing history of interlibrary loans, enabling resource collaboration across library institutions worldwide. Jimmy reflected on the growing need to engage with international publishers to meet the increasingly diverse demands of US public and school libraries aiming to serve multi-ethnic and multicultural communities.

George described the Library of Congress’s unique international acquisition practices through its field offices abroad, engaging foreign libraries in its collection development strategies and reciprocally helping these foreign libraries in their collection development needs, such as trainings and resource exchanges. Gerald and Herbert pointed out that libraries’ user services, like information literacy, have become popular means of engaging with international audiences. George and Ronald stressed the utilization of English-language programming, and John and Joe emphasized digital programming as crucial to the success of literacy programmes in international settings, with Donald commenting on the importance of fostering lifelong learning and informal education.

Various innovative library programmes were discussed by Ronald and Jimmy, including massive open online courses and open educational resources for lifelong learning and career development. Joe, Barack, Bill, Ronald and Jimmy highlighted the big shift to STEM programmes by libraries, using maker spaces and fabrication laboratories’ (fab labs’) physical and digital collaborative spaces:

We saw a big shift towards STEM. And we started working with maker spaces, and doing more programmes around that topic, since it’s such an important subject, I guess, for youth to learn about and help inspire, you know, the next generation of scientists and engineers. (Barack)

Donald emphasized gamification or gaming in libraries, engaging library users to be critically aware of global issues by addressing food production and agriculture through e-sports. George, Barack, Joe and Donald described partnerships with the corporate sector, like Google and Chevron, and digital vendors and publishers, like OCLC, to share their entrepreneurial and digital expertise for STEM outreach in libraries. Harry stressed the emergence of private and corporate actors’ roles in diplomacy, mirroring the influence of their government counterparts.

**Digital transitions and challenges.** The changes from traditional to technology-driven services, particularly the digital transitions within libraries, emerged as a subtheme in this study. John, Harry and Dwight expressed that globalization and technological advancements enable libraries to connect and collaborate with both local and international communities. Such library collaboration and connectivity results in digitalization projects and the use of digital communication tools. Harry and Ronald emphasized the significance of virtual engagement, encompassing virtual meetings and webinars, as a significant aspect of libraries’ digital transition. Joe and George highlighted government priorities in investing in digital resources, such as the Department of State’s eLibraryUSA and the Library of Congress’s World Digital Library, aimed at making libraries’ digital assets available for both American and global audiences. Data analytics and management emerged as critical priorities for the Department of State, mainly when reporting to other branches of government, such as Congress. Donald underscored the importance of libraries’ data-reporting to demonstrate continued support for libraries in the Department of State’s diplomacy work:

[It is important to have a] data management system that will facilitate reporting from the field to our office, that we can then share with stakeholders at the department and with Congress on how American spaces help promote United States foreign policy objectives.

With regard to the management of digital resources, Ronald outlined the shifting role of librarians as digital advisors, facilitating the acquisition, creation, storage and dissemination of libraries’ digital assets. Digital communication and the use of social media for library meetings and outreach was one of the key characteristics of digital transformation in libraries described by Lyndon, Franklin, Donald, George and Jimmy. Donald and Franklin attributed this digital transition to the COVID-19 pandemic, leading to a switch from in-person programming in library spaces to virtual engagement. Lyndon and Donald observed that virtual webinars and blogs have significantly increased their global outreach, attracting greater numbers of unique users. However, Franklin, Jimmy and George emphasized the lack of a social component in virtual programming due to limited interaction time and time-zone differences. This has led to a preference among librarians for a hybrid model of library programming and interaction.

The experts also identified some challenges with digital transition. According to Barack, there are
several challenges associated with the changing preferences and priorities of top-level stakeholders, such as politicians, policymakers and administrators, in collaborating with data science experts and administrators, in international science diplomacy. Another challenge, stressed by Harry and Barack, is the complex digital ecosystem and varying policies and decentralized nature of the digital infrastructure of government and private and academic institutions, which hinders collaboration and management. Harry also argued that an inclination towards a technologically deterministic approach influences librarians’ work, particularly in managing and disseminating knowledge and information to the community:

We started a data concierge study to look at what would the libraries need to do to collaborate in international partnerships, in scientific research. The institutions have very complex ecosystems around research, data management and laws... there’s certainly a technology side – our lives in some way determined by major [digital] corporations that control the infrastructure that we use to communicate, that we use to get our information, that we use to do our jobs.

Discussion

This research explored the library diplomacy practices of US library experts, encompassing their roles in implementing goals, strategies and instruments for diplomacy and international library work. The study identified four major themes regarding US library diplomacy in the 21st century: the implicit and explicit roles of the actors involved; an emphasis on knowledge dialogue and sharing as the overall goal of diplomacy; the strategic use of cultural humility in dialogue and understanding; and the vital role of digitalization in enhancing international library activities and library infrastructures.

Actors’ implicit and explicit roles

The research highlights the varied practices and roles among the diverse actors studied, which included diplomatic, library-based, policy-based, corporate and individual advocates in the US government and nongovernmental institutions. The findings reveal a difference between implicit and explicit roles in library diplomacy. Explicit actors are characterized by their intentional and deliberate use of diplomatic terminology, goals and strategies. They also fully recognize their roles and label themselves as diplomats involved in international library practices. On the other hand, implicit actors are attributed as playing a subtle or indirect role in international engagement and diplomatic practices. These actors have a more nuanced and context-specific understanding of internationalization and international library work, which does not directly align with international relations and diplomatic concepts and processes.

The research reveals that the majority of the actors operate both implicitly and explicitly. For instance, the public and academic librarians, Library of Congress staff and other library advocates in the nongovernmental-institution sector perceived their advocacy and community engagement roles as playing an indirect role in diplomacy, but their actions aligned with their institutions’ overt goals and strategies, akin to the approaches of akin to the approaches of US congress representatives, state politicians, nongovernmental-institution policymakers and academic officials. The research further identifies specific examples of the explicit roles of diplomatic-based actors, including foreign service officers, American Spaces directors and coordinators within the Department of State, library-based and policy-based actors on the committee of the American Library Association’s International Relations Round Table, International Relations Committee officers, and executives at the Library of Congress and Smithsonian, as well as certain academic librarians. Their explicit roles are reflected in their specific job titles, such as regional public engagement specialist, international library initiative specialist, institutional partnership librarian, international outreach librarian, director for international library programmes, head of global engagement initiatives, and senior advisor for the Office of International Relations. As Herbert commented: ‘my title of international outreach librarian is also in institutional partnerships [interest of the university].’

Gerald revealed that his academic institution had transformed from playing an implicit role to having an explicit mission to advance international library work worldwide: ‘In the past, it’s been more implicit. However, since I started in the position of directorship, then that has been more intentional’. Conversely, some library-based actors in federal and state libraries, as well as the private and corporate sectors, were found to be implicit in their roles and actions concerning library diplomacy.

The dimensions of implicitness and explicitness in the actors’ roles in this study resonate with similar recent findings on science diplomacy. Some scholars have noted that the actors involved in implementing science diplomacy projects, such as politicians, government administrators and scientists, may play either explicit or implicit roles in their international engagement (Young et al., 2020).
Knowledge dialogue

This research identifies that libraries emphasize knowledge dialogue as a primary objective of the actors involved in pursuing diplomacy and international engagement. Knowledge dialogue emphasizes the unique position libraries hold in acquiring and managing vast amounts of information and resources, harnessing learning and creativity skills over generations, and their commitment to making knowledge accessible to a broader community. The underlying goals related to knowledge dialogue include advocating for freedom of information, combating information censorship such as Internet filtering and book banning, supporting open-access initiatives and innovation, and advancing EDIA and sustainability values. Contemporary libraries and the practice of librarianship in the 21st century use diplomacy to create spaces for dialogue, the exchange of ideas, problem-solving and critical thinking. This is evident in the commitment of the Department of State’s American Spaces, Library of Congress and American Library Association’s International Relations Round Table to sharing knowledge of library practices between American librarians and their international counterparts worldwide. The findings of this study align with practices in health studies, where knowledge dialogue promotes a two-way mode of communication, intercultural exchange and consensus-building (Pan American Health Organization, 2022). This study also resonates with Knight’s (2023) concept of ‘knowledge diplomacy’ in international and higher education, research and innovation. This study identifies the unique role of libraries and information centres as agents and assets of academic and research institutions for the purpose of internationalization and diplomacy. This perspective adds a novel dimension that has not been previously addressed in the existing framework of knowledge diplomacy.

Cultural humility

This research identifies cultural humility as a central theme in describing the strategies employed by library actors to initiate library diplomacy programmes. This theme encompasses subthemes such as active listening, trust in the library profession and institution, a shared commitment to addressing challenges, and a glocal perspective. Cultural humility, as defined by LIS scholars such as Goodman and Nugent (2020) and Hurley et al. (2019), involves self-reflective recognition of one’s culture, customs, beliefs and values, and a willingness to learn from others’ experiences and practices. Cultural humility is commonly practised in public health and social work, but is also gaining traction in the LIS field.

These findings on cultural humility parallel existing research on cultural diplomacy highlighting cross-cultural dialogue, the recognition of power imbalances, and the promotion of mutually beneficial cultural exchanges in libraries and cultural centres (Andrews and Kim, 2017; Mariano and Vårheim, 2021; Melissen, 2005). One of the experts in this study said that acknowledging nuanced identities helps develop reflection on one’s own identities and world views by harnessing a multi-dialogue rather than monocultural approach:

Now, I think moving from more of a mindset of cultural competency and moving towards cultural humility and understanding the complexities of cultural exchange, I don’t think anybody’s really looking to go back to, like, [the] monocultural mindset of diplomacy, but instead are approaching things in a much more nuanced way.

(Harry)

The concept of a glocal perspective also complements the cultural humility approach, supporting grass-roots knowledge by incorporating global goals with local relevance, as exemplified by the practices of the American Library Association’s International Relations Round Table’s sister-city library initiatives and discussions around the Sustainable Development Goals.

Digitalization

This theme identifies the multifaceted digital transformation and technological changes in libraries in the 21st century. Digitalization emerges as a main theme due to the blurring of the boundaries between local and foreign publics, facilitated by the democratization of digital information – making it accessible to everyone. Twentieth-century practice, specifically through the United States Information Agency libraries under the Smith–Mundt Act, was exclusively aimed at foreign audiences. However, the current practice of library diplomacy has become more inclusive, adopting a glocal approach and encompassing digital audiences. For instance, the American Spaces programmes, exchanges and services extend to both American and international audiences by using social media and other digital engagement tools, further democratizing access to information. The increase in the number of Library of Congress webinar programmes and its 4 Corners of the World blog have promoted local and global interest in its special collections from both diaspora communities and international students in the USA.
Second, digitalization as a diplomatic tool highlights the shift towards digital resources, massive open online courses, maker spaces, gamification and digital literacy programmes to engage with so-called ‘digital natives’ and cater to the emerging digital society in the global sphere. Third, the digitalization of library diplomacy reveals enhanced practices to bolster international library work. The incorporation of data analytics, data visualization, digitally enhanced technology for interlibrary loans, cultural preservation, and virtual meetings and conferences increased rapidly during the COVID-19 pandemic and has been increasing significantly since. Like the international library modernization and technologies of the 20th century, digitalization plays a similar role in current practice, encouraging communities to work and collaborate on enhancing library services worldwide. This theme closely aligns with the research on digital diplomacy. Manor (2019), in his research on the digitalization of public diplomacy, describes the tangible impact of digital technologies on the diplomatic practices of ministries of foreign affairs worldwide, highlighting the merging of local and global publics into a digital public.

Limitations
This research study, which has delved into the insights, practices and conceptual understanding of library diplomacy among library experts in the USA, has certain limitations. The researcher recognizes that there is a dearth of literature at present, with the majority of the existing research focusing on 20th-century phenomena and only a few LIS scholars having explored this topic. Therefore, the research necessitated the inclusion of insights from closely related fields of study, such as history, international relations and social sciences, to enrich the understanding of library diplomacy. Second, the research data is contextualized in the USA, potentially limiting its applicability to global perspectives and an overall understanding of the concept of library diplomacy. However, this empirical research hopes to serve as a foundational reference and starting point for further exploration and a deeper understanding of library diplomacy practices globally.

Conclusion
In conclusion, this article has addressed the following research question: How is library diplomacy being practised and used in the USA in the early 21st century? It has looked at the actors’ roles, goals and strategies, and the instruments employed by US international library experts. Historically, the primary intent behind leveraging libraries as a vehicle for public diplomacy in the 20th century was to disseminate American culture, values and technologies, often associated with cultural hegemony and information propaganda strategies. This research, however, posits that early 21st-century library diplomacy practices are driven by diverse actors with implicit and explicit roles in policy, advocacy and public engagement. The main focus is on fostering knowledge dialogue and knowledge sharing; advocating for the core values of librarianship, such as freedom of information, open access, EDIA and sustainability values; and embracing cultural humility as a strategy to achieve cross-cultural and multi-dialogue understanding at the local and global levels. Parallel to the 20th-century digital revolution, digitalization continues to shape library diplomacy in the early 21st century, echoing various digital practices and mainly to engage the digital public. This study’s contribution is to encapsulate the uncharted area of library diplomacy practices in the 21st century. Its limitation, however, stems from its specific geographical context of the USA, which may restrict the findings’ applicability to a more comprehensive global understanding of the subject. Therefore, the researcher calls for a broader exploration across other global superpowers, such as China, the European Union, India and Russia, and including the global and regional contexts of the Global North and Global South. Such an extended research inquiry could enrich global understanding of library diplomacy’s multifaceted international policies and practices in knowledge, information, digital and data diplomacy.

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Notes
1 The core values of librarianship are a set of values that define, inform and guide modern American librarianship and professional practice. These values reflect the history and ongoing development of the profession, and have been advanced, expanded and refined by numerous policy statements of the American Library Association.
They include: access, confidentiality/privacy, democracy, diversity, education and lifelong learning, intellectual freedom, preservation, the public good, professionalism, service, social responsibility and sustainability. For more information, see: https://www.ala.org/advocacy/advocacy/intfreedom/corevalues

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Mariano: Understanding US library diplomacy practices in the 21st century

Author biography

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AI-generated content tools and students’ critical thinking: Insights from a Chinese university

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Abstract
This study examines the impact of artificial-intelligence-generated content tools on students’ critical thinking skills and their attitudes towards these tools. A survey of 851 students from a Chinese university was conducted to investigate their usage patterns, motivations, perceived benefits and risk awareness, and the importance of critical thinking skills. The study also explores how libraries and librarians can help students develop critical thinking skills. The findings reveal that male and non-binary students utilized artificial intelligence tools more frequently, highlighting a research gap. The study uncovers motivations such as saving time and effort. It also demonstrates students’ awareness of the risks and limitations, emphasizing the need for critical thinking skills in navigating artificial-intelligence-generated content tools. These findings have significant implications for academic libraries, as students expressed a desire for education and training in artificial intelligence literacy and critical thinking. Libraries can provide resources, workshops and guidance to empower students in informed and critical thinking practices.

Keywords
AI-generated content tools, critical thinking, libraries, ChatGPT era, student perspectives

Introduction
The pervasive influence of artificial-intelligence-generated (AI-generated) content on students’ critical thinking is a pressing concern in today’s society. While AI-generated content holds the potential to enhance efficiency and productivity, there is apprehension that it may impede students’ critical thinking abilities (Wu et al., 2023). Numerous studies have expressed concerns that the use of ChatGPT as a search engine could lead to a decline in critical thinking skills (Dans, 2023) and that AI tools might hamper creativity and originality in students’ writing (Spector and Ma, 2019).

Despite these concerns, university students exhibit positive attitudes toward AI-generated content tools and acknowledge their potential benefits, such as improved efficiency and accuracy (Hoyos, 2023). However, students also recognize the potential limitations of these tools in fostering critical thinking and creativity. To effectively integrate AI into education,
it is crucial to comprehend its opportunities, challenges and limitations.

Libraries emerge as vital allies in this transformative landscape. Fernandez’s (2023) study underscores that libraries can provide essential information literacy education, enabling students to evaluate and employ AI-generated content tools effectively. Additionally, Adetayo’s (2023) research reveals that libraries can leverage ChatGPT for technical and reader services, albeit with the understanding that it cannot replace human librarians due to its inherent limitations, such as inaccurate query responses and limited comprehension. Adetayo (2023) stresses that, instead, ChatGPT should be viewed as a supplementary tool, complementing the expertise of human librarians.

In light of these considerations, this study embarks on crucial exploration. It aims to delve into students’ attitudes and perceptions regarding AI-generated content tools and their awareness of the vital role critical thinking skills play in the modern educational landscape. Through rigorous examination, this research seeks to uncover the intricacies of AI integration and critically analyse its impact on students’ intellectual growth.

To achieve this goal, the study employed a comprehensive survey to collect data from students across various age groups, genders, university years and academic programmes. The survey focused on questions concerning the frequency of using AI-generated content tools, reasons for use, and associated benefits and risks. Additionally, it investigated how libraries help students developing critical thinking skills.

**Literature review**

In recent years, the field of education, including higher education, has witnessed significant transformations due to the emergence of AI. One specific area where AI has found applications is academic libraries, where AI chatbots have gained prominence. Adetayo (2023) delves into the utilization of AI chatbots in academic libraries, with a focus on the rise of ChatGPT as a leading chatbot in this domain. Additionally, Hoyos (2023) examines the use of AI in classrooms and discusses its potential benefits and challenges. Hoyos found that the benefits of AI include its ability to level the playing field for students, providing equal opportunities for high-quality work. It can also help students stay organized and manage their time effectively, and offer personalized suggestions. Proper training in using AI tools is crucial for maximizing their benefits. The challenges, such as concerns around cheating, necessitate strategies such as oral examinations and handwritten assessments to combat AI-generated cheating. However, the focus should be on the opportunities AI offers in enhancing education.

While AI holds promise in higher education, it is imperative to consider students’ perceptions and perspectives. Despite limited research on students’ attitudes towards AI-generated content tools like ChatGPT, a study conducted by Chan and Hu (2023) focuses on students’ familiarity, willingness to engage, perceived benefits (such as personalized learning support and research capabilities) and challenges (including accuracy and ethical concerns). Conversely, Chesterman (2023) explores the threat posed to the economic foundations of creativity by advanced AI tools like Stable Diffusion and ChatGPT, which can produce artwork and text that are almost indistinguishable from human creations. Traditionally, knowledge workers earned their living by analysing and writing – skills that are now replicable by AI with minimal time and cost. Chesterman (2023) suggests emphasizing the need for clear guidelines on the ownership of content generated by AI and the requirement for such content to be distinguishable as AI-produced, addressing the challenges posed by these technologies.

Early career researchers can also benefit from leveraging ChatGPT to enhance their productivity – for example, by using ChatGPT to debug code or brainstorm research ideas, as highlighted in an article by Askham (2023). Uludag (2023) conducted an interview with ChatGPT to assess its creativity in the field of psychology. It was found that ChatGPT has creative potential, especially in certain contexts. However, further research is required to optimize ChatGPT’s design and explore its creative capabilities in diverse fields. Zawacki-Richter et al. (2019) conducted a systematic review of AI applications in higher education. They identified challenges such as a lack of critical reflection on risks, weak connections to pedagogical theories, and the need for further exploration of the ethical and educational aspects in AI applications in higher education.

Critical thinking skills are of paramount importance in education, and an increasing body of research is exploring strategies for fostering these skills. Onen (2021) discusses approaches to cultivating critical thinking among graduate students. The study suggests the formal inclusion of critical thinking in the curricula of graduate programmes to enhance its cultivation among students, despite other existing challenges. Huber and Kuncel (2016) present research on developing critical thinking among college students. They found that educators consider critical thinking to be vital, but its effectiveness in college
teaching is unclear. The study raises questions about the methods used to teach critical thinking in college and emphasizes the need for more effective approaches to ensure lasting improvements in critical thinking skills and attitudes among students. Todd et al. (2021) go beyond theoretical concepts and standards. Their article provides practical applications through case studies, demonstrating a model and framework for student engagement. This model aims to create an online course environment and strategies specifically geared towards developing critical thinking skills. Omariba (2021) explores the use of technology-enhanced classrooms to enhance critical thinking skills. This study found that technological tools can aid in collecting, analysing, displaying and communicating information.

The impact of ChatGPT on education has become an area of burgeoning interest. Paredes Fuentes (2023) shares initial lessons learned from employing ChatGPT in teaching macroeconomics. This study concludes that ChatGPT and similar technologies are here to stay and might become as prevalent as research engines in academia. Despite the current limitations, academia must engage with these technologies. Teaching and assessments need to adapt to accommodate them effectively. Lo (2023) presents a literature review on the influence of ChatGPT on education. The article suggests immediate actions, including updating assessment methods and institutional policies in schools and universities. It emphasizes the importance of instructor training and student education to effectively respond to ChatGPT’s impact on the educational environment. Bitzenbauer (2023) reports on a pilot study investigating ChatGPT’s application in physics education to foster critical thinking skills among secondary school students. The article provides two practical examples of implementing ChatGPT in teaching, demonstrating its easy integration into the classroom setting. Rusandi et al. (2023) discuss how ChatGPT can bridge the gap between AI and education. They emphasize that during AI integration, critical thinking and academic integrity should remain central concerns to ensure the responsible and meaningful use of AI technologies in education and research.

However, concerns have also been raised regarding the use of ChatGPT in education and research. Pellenbani (2023) points out that there is a debate in the scientific community regarding the use of AI tools like ChatGPT in publications. Policies have been developed by journals, including Nature, Science and JAMA: Journal of the American Medical Association, which prohibit naming such tools as credited authors due to the lack of accountability AI tools have for the work. Anders (2023) questions whether employing ChatGPT could be deemed cheating or plagiarism. Educational institutions need to future-proof their curricula to handle the forthcoming wave of AI-assisted assignments, ensuring that ethical guidelines and boundaries are clearly defined. Dai et al. (2023) reconceptualize ChatGPT and generative AI as innovations driven by students in higher education. Empowering students through ChatGPT requires collaborative efforts among stakeholders to address challenges related to student training, curricula, assessment, technology development and governance. McCarthy (2023) examines how the use of ChatGPT could reshape views on academic misconduct. The study found that ChatGPT’s introduction threatens traditional concepts such as plagiarism, authorship, ownership and learning in higher education.

Collectively, these studies demonstrate that while the integration of AI in education offers opportunities and challenges, an increasing body of research is investigating the potential of ChatGPT and other AI applications in education, as well as the best practices for cultivating critical thinking skills. This research study aims to address gaps in the existing literature by exploring university students’ attitudes towards AI-generated content tools, such as ChatGPT, DALL-E and the new Bing. It also investigates their usage frequency and motivations, and associated benefits and risks, as well as the significance of developing critical thinking skills in relation to text- or data-mining tools, recommendation systems, image or object recognition, automated content summarization, sentiment analysis, and speech recognition or synthesis. Additionally, the study investigates the role of libraries in enhancing students’ critical thinking abilities in the ChatGPT era.

**Method**

In this study, we conducted a survey to explore college students’ attitudes and behaviours regarding AI-generated content tools and their perspectives on critical thinking skills. The survey comprehensively covered various aspects, including the use of AI-generated content tools, reasons for utilizing these tools, perceived benefits, awareness of risks and limitations, the importance of critical thinking skills for future career development, and exposure to AI literacy and critical thinking education from libraries or other sources. We aimed to assess the students’ confidence in distinguishing between AI-generated and human-generated content, their perspectives on university resources, and libraries’ support for fostering critical thinking skills in the ChatGPT era.
Open-ended questions were included to delve into the ethical dilemmas associated with the use of AI-generated content in academic work.

The survey questionnaire consisted of four sections with a total of 20 items utilizing closed-ended, multiple-choice and open-ended formats. These questions were specifically crafted to probe students’ usage patterns of AI-generated content tools, their perceptions of the benefits and risks of AI, their understanding of the significance of critical thinking skills, and their exposure to AI education and training. The survey was administered online, and the participants were allotted approximately 20 minutes to complete it.

The analysis of the survey results addresses the following research questions:

1. Are there any differences in the usage of AI content-generation tools in the ChatGPT era based on college students’ age, gender, academic year and field of study?
2. What are the primary motivations for college students to utilize AI-content tools?
3. What differences exist in the motivation to utilize AI-generated content tools based on students’ age, academic year, major and gender?
4. What benefits can students receive from utilizing AI-generated content tools?
5. How aware are college students of the potential risks and limitations associated with AI-generated content tools?
6. What are the perceptions of college students regarding critical thinking skills and the significance of critical thinking in academic research and daily life, and their views on AI-generated content tools?
7. What resources and training do college students expect libraries to provide in order to help them enhance their critical thinking skills?

Participants

In addition to the previously mentioned information, it should be noted that the study adhered to the ethics rules and procedures in China. The survey was conducted anonymously to ensure confidentiality and protect the privacy of the participants. All of the participants signed a consent form. We also received consent from the parents or guardians of the participants who were under 18.

The study focused on examining the characteristics of the 869 participants who completed the survey through social media platforms at a Chinese university. The participants were selected using a convenience sampling method to ensure a representative sample. The sample size was determined based on a total population of 34,813, which included 19,061 undergraduate students, 12,304 Master’s-level students and 2712 doctoral-level students. The study aimed for a confidence level of 95% and a margin of error of 5%.

Here are some of the key participant characteristics identified in the study. These participant characteristics provide insights into the demographic composition of the survey respondents at the Chinese university:

- **Age range.** The age group with the highest percentage was 18–20, accounting for 36.66% of the participants. This was followed by the 21–23 age group, accounting for 35.37%. The lowest percentage was observed in the under 18 age group, accounting for .59%.
- **Gender.** Most of the respondents (63.57%) were male. Females accounted for 31.96% of the participants, while those who preferred not to disclose their gender or identified as non-binary accounted for 4.47%.
- **Academic year.** The difference between graduate and undergraduate students was not significant. Undergraduate students represented 54.18% of the participants, while graduate students accounted for 45.82%.
- **Field of study.** Engineering disciplines had the highest percentage, with 62.98% of the participants belonging to this field. Humanities and social sciences accounted for 13.28%, natural sciences for 8.7%, business and economics for 3.06%, and other fields for 11.99%.

Data collection and processing

The study adopted a survey tool equivalent to SurveyMonkey and Qualtrics – Wenjuanxing – to distribute the survey through university social media platforms over the duration of two weeks. During this period, we received a total of 869 responses.

To ensure the integrity of the survey sample, we implemented data-cleaning steps. Initially, we eliminated records with response times below 60 seconds, taking into account the length of the questionnaire and conducting a preliminary assessment of response times on a limited scale. Moreover, we eliminated records in which the same option was chosen for all questions except for the essential demographic information. These measures yielded a total of 851 valid
responses, which were subsequently subjected to further analysis.

To assess the reliability of the questionnaire, we conducted an internal consistency analysis on specific sections of the survey: Section 2 (Usage of AI-Generated Content Tools), Section 3 (Critical Thinking Skills) and Section 4 (Library Strategies). The reliability coefficients obtained were .675, .671 and .671, respectively. These coefficients meet the required standards, indicating satisfactory reliability for the questions in these sections.

Data analysis

For the purpose of data analysis, we utilized the Statistical Package for the Social Sciences software. We also assessed the normality of the data using the Kolmogorov–Smirnov test. The results indicated a deviation from normal distribution for the scale items in the questionnaire. Consequently, non-parametric tests were employed to investigate differences among the independent samples.

For the scale-type items, we employed the Kruskal–Wallis H test to examine differences among the samples. If the Kruskal–Wallis test yielded statistically significant results, we proceeded to conduct the Mann–Whitney test to determine specific pairwise differences between the groups. On the other hand, the analysis of non-scale-type items involved the use of the Pearson chi-square test. In cases where the Pearson chi-square test showed significance, we performed pairwise comparisons utilizing the Bonferroni adjustment method to explore specific differences between the two groups. We also employed cross-tabulation to visually illustrate the differences in the proportions.

Results

Differences among students in the utilization of AI content-generation tools based on age, gender, grade level and major

The study investigated whether there are differences in the utilization of AI content-generation tools in the ChatGPT era based on students’ age, gender, grade level and major. The survey received 869 valid responses regarding the frequency of using AI-generated content tools. The responses were distributed as follows: 10.01% strongly agreed, 36.36% agreed, 43.84% were neutral, 7.25% disagreed and 2.53% strongly disagreed. As shown in Figure 1, a substantial proportion of the respondents (46.37%) either agreed or strongly agreed with using AI-generated content tools more frequently than before. However, the majority of the respondents (51.62%) expressed a neutral or dissenting stance towards increased usage of AI-generated content tools.

Additionally, we conducted a Kruskal–Wallis test to explore the variations in AI content-generation tool utilization among the students based on age, gender, grade level and major. The question asked was whether individuals use AI-generated content tools more frequently than before (see Table 1). The findings indicate that age does not have a significant impact on the frequency of AI-generated content tool usage among students. Furthermore, no notable
differences were observed in AI-generated content tool utilization based on the students’ grade level and major.

However, gender-related disparities in AI-generated content tool usage were identified. Specifically, male students and students identifying as non-binary tend to utilize AI-generated content tools more frequently than before. Moreover, non-binary students exhibit a stronger inclination towards the usage of AI-generated content tools compared to other gender identities. According to the \( p < .01 \) value in Table 1, there is variability in gender regarding the frequency of using AI-generated content tools in the ChatGPT era.

Additionally, we utilized the Mann–Whitney U-test to determine specific pairwise differences between groups based on gender (see Table 2). Based on Table 2, it was found that there were group differences between females (F) and males (M), females and non-binary (N), males and non-binary, males and prefer not to disclose (P), and non-binary and prefer not to disclose.

Finally, we performed a cross-examination to assess the disparities between genders in their attitudes towards the frequency of AI-generated content tool utilization. The results are presented in Table 3. For each gender identification, the first row displays the percentages of attitudes based on gender and the second displays the percentages pertaining to the frequency of usage of AI-generated content tools in the ChatGPT era.

Table 1. Kruskal–Wallis test results.

<table>
<thead>
<tr>
<th>Variable</th>
<th>( H )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group</td>
<td>6.961</td>
<td>.138</td>
</tr>
<tr>
<td>Academic year</td>
<td>4.505</td>
<td>.479</td>
</tr>
<tr>
<td>Major</td>
<td>6.635</td>
<td>.156</td>
</tr>
<tr>
<td>Gender</td>
<td>25.208</td>
<td>.000***</td>
</tr>
</tbody>
</table>

***\( p < .01 \).

Table 2. Mann–Whitney U-test results.

<table>
<thead>
<tr>
<th>Gender group</th>
<th>Number of respondents (( n ))</th>
<th>( Mdn )</th>
<th>( U )</th>
<th>( p )</th>
<th>Cohen’s ( d )</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>M</td>
<td>272</td>
<td>541</td>
<td>3 2</td>
<td>84242.5</td>
</tr>
<tr>
<td>F</td>
<td>N</td>
<td>272</td>
<td>17</td>
<td>3 2</td>
<td>3335</td>
</tr>
<tr>
<td>F</td>
<td>P</td>
<td>272</td>
<td>21</td>
<td>3 3</td>
<td>2365.5</td>
</tr>
<tr>
<td>M</td>
<td>N</td>
<td>541</td>
<td>17</td>
<td>2 2</td>
<td>6085</td>
</tr>
<tr>
<td>M</td>
<td>P</td>
<td>541</td>
<td>21</td>
<td>2 3</td>
<td>4016</td>
</tr>
<tr>
<td>N</td>
<td>P</td>
<td>17</td>
<td>21</td>
<td>2 3</td>
<td>82</td>
</tr>
</tbody>
</table>

\( \approx p < .05. \quad \approx \approx p < .01. \)

Table 3 shows that the differences between males and females primarily manifest in their attitudes. Males exhibit the highest proportion of agreement and strong agreement, while females have the highest proportion of neutrality. Regarding the differences between males and non-binary individuals, non-binary college students show an agreement and strong agreement proportion exceeding 70%, with less than a quarter expressing neutrality. In contrast, among male students, the proportion of agreement and strong agreement exceeds 50%, while neutrality accounts for over 40%.

The differences between males and females compared to the differences between males and students who prefer not to disclose their gender are of a similar nature. However, the magnitude of the differences varies. Based on the Cohen’s \( d \) value, it can be observed that the difference between males and females is of a smaller magnitude, while the difference between males and students who prefer not to disclose their gender is of a moderate magnitude.

The main distinction between females and non-binary individuals lies in the distribution of attitudes. Among non-binary individuals, the majority express agreement and strong agreement, while among females the largest proportion leans towards neutrality. Significant differences are found among non-binary individuals, as well as students who prefer not to disclose their gender. Non-binary individuals display the highest proportion of agreement and strong agreement, followed by neutrality, and the lowest proportion of disagreement. Conversely, students who prefer not to disclose their gender have the highest proportion of neutrality, followed by agreement and strong agreement, and the lowest proportion of disagreement and strong disagreement. However, the disparity in proportions between agreement and disagreement is not substantial, amounting to less than 5%.
Primary motivations to use AI content-generation tools

The research findings unveiled the primary motivations driving college students to employ AI content-generation tools, which were identified as time and effort saving (see Figure 2).

Differences in motivation to use AI-generated content tools based on students’ age, academic year, major and gender

We employed a chi-square test to examine the differences in motivation for using AI-generated content tools based on students’ age, academic year, major and gender (see Table 4). The note **p < .05 signifies that there is a statistically significant difference in the

Table 3. Cross-tabulation displaying disparities between genders in attitudes towards frequency of usage of AI-generated content tools.

<table>
<thead>
<tr>
<th>Genders</th>
<th>M</th>
<th>n</th>
<th>%</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>63</td>
<td>11.6</td>
<td>210</td>
<td>224</td>
<td>29</td>
<td>15</td>
<td>541</td>
</tr>
<tr>
<td></td>
<td></td>
<td>74.1</td>
<td>38.8</td>
<td>41.4</td>
<td>5.4</td>
<td>2.8</td>
<td>75.0</td>
<td>100</td>
</tr>
<tr>
<td>F</td>
<td>n</td>
<td>14</td>
<td>5.1</td>
<td>91</td>
<td>134</td>
<td>31</td>
<td>2</td>
<td>272</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>16.5</td>
<td>33.5</td>
<td>49.3</td>
<td>11.4</td>
<td>0.7</td>
<td>10.0</td>
<td>32.0</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>41.2</td>
<td>29.4</td>
<td>23.5</td>
<td>5.9</td>
<td>0.0</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>8.2</td>
<td>1.6</td>
<td>1.1</td>
<td>1.6</td>
<td>0.0</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>n</td>
<td>7</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>41.2</td>
<td>33.5</td>
<td>23.5</td>
<td>5.9</td>
<td>0</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>8.2</td>
<td>1.6</td>
<td>1.1</td>
<td>1.6</td>
<td>0</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>n</td>
<td>1</td>
<td>4.8</td>
<td>5</td>
<td>10</td>
<td>2</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>4.8</td>
<td>23.8</td>
<td>47.6</td>
<td>9.5</td>
<td>14.3</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>1.2</td>
<td>1.6</td>
<td>2.7</td>
<td>3.2</td>
<td>15.0</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>n</td>
<td>85</td>
<td>311</td>
<td>372</td>
<td>63</td>
<td>20</td>
<td>851</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>10.0</td>
<td>36.5</td>
<td>43.7</td>
<td>7.4</td>
<td>2.4</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Chi-square test results.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>$\chi^2$</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group</td>
<td>9.683</td>
<td>.644</td>
</tr>
<tr>
<td>Academic year</td>
<td>30.511</td>
<td>.010**</td>
</tr>
<tr>
<td>Major</td>
<td>15.046</td>
<td>.239</td>
</tr>
<tr>
<td>Gender</td>
<td>14.333</td>
<td>.111</td>
</tr>
</tbody>
</table>

**p < .05.

Figure 2. Main reasons for using AI-generated content tools.
We also performed cross-tabulations to analyse and identify significant differences in academic years concerning the primary motivations for utilizing AI-generated content tools. Table 5 shows the cross-tabulations were performed to examine the primary motivations based on academic years. The table presents the results of the cross-tabulations, showing the relationship between academic years and the primary motivations.

### Table 5. Results of cross-tabulations showing the relationship between academic year and primary motivations.

<table>
<thead>
<tr>
<th>Academic year</th>
<th>Saving time and effort</th>
<th>Improving quality of work</th>
<th>Enhancing creativity</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year</td>
<td>n=178</td>
<td>18</td>
<td>14</td>
<td>4</td>
<td>214</td>
</tr>
<tr>
<td></td>
<td>% 83.2</td>
<td>8.4</td>
<td>6.5</td>
<td>1.9</td>
<td>100</td>
</tr>
<tr>
<td>Second year and above</td>
<td>n=138</td>
<td>41</td>
<td>17</td>
<td>3</td>
<td>199</td>
</tr>
<tr>
<td></td>
<td>% 69.3</td>
<td>20.6</td>
<td>8.5</td>
<td>1.5</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>n=316</td>
<td>59</td>
<td>31</td>
<td>7</td>
<td>413</td>
</tr>
<tr>
<td></td>
<td>% 76.5</td>
<td>14.3</td>
<td>7.5</td>
<td>1.7</td>
<td>100</td>
</tr>
</tbody>
</table>

**Benefits of using AI-generated content tools**

Approximately 59.7% of the college students strongly agreed or agreed that AI content-generation tools would bring benefits, while only 2.59% held opposing views, and 37.72% remained neutral. Gender differences were observed on this matter, with over half of males expressing agreement and approximately one-third maintaining a neutral position, and females having the highest proportion of agreement, closely followed by neutrality, with both exceeding 40% with minimal differences. Non-binary individuals exhibited the highest proportion of strong agreement, followed by agreement, with both exceeding 40% and showing slight differences. Students who preferred not to disclose their gender had a higher proportion of neutrality, followed by strong agreement and agreement, with each accounting for approximately one-fifth (see Figure 3).
Potential risks and limitations of AI-generated content tools

The majority of the students (82.84%) demonstrated a noteworthy level of awareness regarding the potential risks and limitations associated with AI-generated content tools. Interestingly, gender differences were observed in the responses to potential risks and limitations, with females displaying a higher level of awareness compared to males. Also in comparison to females, non-binary individuals were more likely to respond negatively, indicating a lack of awareness, when asked about their understanding of the potential risks and limitations.

Among the surveyed students, the top-three risks and limitations identified were a lack of originality and creativity, plagiarism and inaccuracy. A significant proportion (78.01%) expressed concerns about the lack of originality and creativity associated with AI-generated content tools (see Figure 4).

Critical thinking skills

As shown in Figure 5, an overwhelming majority of the college students (88.96%) acknowledged the importance or high importance of fostering critical thinking skills for both academic research and daily life during their university studies. Notably, the responses to this inquiry did not reveal significant
differences based on factors such as age, gender, grade level and major.

As shown in Figure 6, among the college students, 86.02\% considered the development of critical thinking skills to be very important or important for their future career progression. Similar to the previous question, no noteworthy distinctions were observed in the responses based on age, gender, grade level and major (p values > .05).

Regarding encounters with ethical dilemmas linked to the utilization of AI-generated content tools, approximately 96.83\% of the participants reported not encountering any such dilemmas. However, on examining the descriptions provided by those who did face dilemmas, it became evident that they primarily arose in fields such as painting, drawing, cartoons and images. The keywords employed by the respondents to elucidate these ethical dilemmas included concepts of threat, conflict, issues of ownership and uncertainty.

**Resources and training**

A minority of the students (less than 10\%) had received explicit education or training focused on AI literacy and critical thinking skills. Among the respondents who had received relevant training or education, a range of training formats was reported, with lectures on AI and information literacy being the most prevalent. Approximately 57.7\% of the students expressed a desire for additional education or training concerning AI literacy and critical thinking skills. As shown in Figure 7, the students exhibited diverse preferences for various forms of education or training targeting AI literacy and critical thinking skills.

A significant majority of the students (over two-thirds of the participants) expressed a positive perception of the university’s capacity to provide sufficient resources and support for fostering critical thinking skills in the era of ChatGPT. Consensus on this matter was observed irrespective of age, gender, grade level or field of study, as these factors did not exhibit significant differences in the responses.

Regarding opinions and suggestions on how libraries can contribute to the promotion of critical thinking in the era of ChatGPT, the following points were identified: organizing lectures, training courses and other activities to enhance students’ critical thinking abilities; acquiring relevant books and journals aimed at augmenting critical thinking; offering credit courses focused on the topic; and implementing initiatives to foster critical thinking, such as organizing debates, creating educational games, producing promotional videos and utilizing customized micro-videos that align with students’ interests. Additionally, libraries can effectively disseminate and facilitate these efforts through LibGuides and other platforms by means of notifications.

**Discussion**

This discussion section aims to provide an analysis and interpretation of the study’s findings in relation to the information presented in the introduction and literature review. By examining the congruence and divergence between the results and previous research, a comprehensive understanding of the study’s implications can be achieved.

The present study focused on investigating the impact of AI-generated content tools on students’
Critical thinking skills and their attitudes towards such tools. The introduction highlights concerns expressed by researchers regarding the potential limitations of AI-generated content on critical thinking, which are supported by previous findings, indicating a decrease in creativity and originality in writing when using AI tools (Dans, 2023; Spector and Ma, 2019; Wu et al., 2023). Conversely, positive attitudes towards AI-generated content tools have been identified among university students (Hoyos, 2023). These contrasting perspectives lay the foundations for exploring the consistency and inconsistency of the current study’s findings.

The literature review reveals the increasing utilization of AI chatbots in academic libraries, with ChatGPT emerging as a prominent tool in this field (Adetayo, 2023). The review also explores students’ perceptions of generative AI and underscores their recognition of the potential benefits (Chan and Hu, 2023). Additionally, the importance of cultivating critical thinking among college students is emphasized, providing a basis for examining the impact of AI-generated content tools on this essential skill (Huber and Kuncel, 2016). A review of the literature on ChatGPT’s influence on education further contextualizes the present study (Lo, 2023).

On analysing the results, several noteworthy consistencies and inconsistencies have been identified. In terms of usage patterns, the study found that male and non-binary students exhibited a higher frequency of utilizing AI-generated content tools compared to previous levels. This investigation fills a gap in the existing literature by specifically examining gender differences in technology adoption within the context of AI-generated content tools.

The study also examined the motivation behind using AI content-generation tools – namely, the desire to save time and effort. There is no specific mention of previous studies directly investigating the motivation behind using AI content-generation tools, and specifically the desire to save time and effort. Furthermore, the study demonstrated that the majority of the students were aware of the potential risks and limitations associated with AI-generated content tools, which corroborates the concerns raised in the literature (Dans, 2023; Spector and Ma, 2019). Dans (2023) expresses concerns about the decline in critical thinking skills when using ChatGPT as a search engine. Spector and Ma (2019) suggest that AI tools can decrease creativity and originality in students’ writing. This suggests that students recognize the drawbacks of solely relying on AI-generated content tools and underscores the importance of promoting critical thinking skills to navigate these tools effectively.

Notably, the finding that 88.96% of the college students acknowledged the importance or high importance of cultivating critical thinking skills resonates with the literature, which emphasizes the significance of critical thinking in academia and daily life (Huber and Kuncel, 2016). This reaffirms the value of integrating critical thinking education within the curriculum, particularly in the context of AI-generated content tools.

However, while the literature review highlights positive attitudes towards AI-generated content tools among university students, the present study did not explicitly assess student attitudes towards such tools.
Future research should explore this aspect to provide a more comprehensive understanding of students’ perceptions.

Considering the implications of the findings, academic libraries play a significant role. With 57.7% of the students expressing a desire for additional education or training on AI literacy and critical thinking skills, there is an opportunity for libraries to support students in developing these essential competencies. By providing resources, workshops and guidance on critically evaluating and utilizing AI-generated content tools, libraries can contribute to fostering informed and critical thinking among students.

In conclusion, this study examined the consistency and inconsistency between the findings and the information presented in the introduction and literature review. While certain consistencies were observed, such as gender differences in usage patterns and the importance of critical thinking skills, further research is warranted to explore students’ attitudes towards AI-generated content tools. These findings offer valuable insights for academic libraries in enhancing students’ AI literacy and critical thinking skills, empowering them to navigate the digital landscape effectively.

One limitation of the study is that it was conducted solely at a Chinese university. Therefore, the results obtained from this study may not provide a comprehensive representation of the seven research questions for college students in general. It is important to acknowledge that cultural, educational and contextual factors specific to the Chinese university setting might have influenced the findings. Therefore, caution should be exercised when generalizing the results to a broader population of college students. Future research should aim to replicate the study in diverse settings and cultural contexts to obtain a more holistic understanding of the topic.

Conclusion
This study surveyed 851 students from a Chinese university to examine the impact of AI-generated content tools on students’ critical thinking skills and their attitudes towards these tools. The analysis aimed to explore the role of libraries in supporting students in navigating AI-generated content tools and fostering critical thinking. The findings show that male and non-binary students used AI tools more frequently, contributing to a research gap. Motivations such as time and effort saving were identified. The students demonstrated awareness of the risks and limitations associated with AI-generated content tools, highlighting the importance of critical thinking skills in utilizing these tools. While the study has focused on the impact on critical thinking skills, it also reveals the significance of developing these skills in the academic context.

Future research is needed to assess student attitudes towards AI-generated content tools. The study has implications for libraries, as the students expressed a desire for additional education and training in AI literacy and critical thinking. Libraries can provide resources, workshops and guidance to empower students in evaluating and utilizing AI-generated content. Overall, this study contributes to existing knowledge by examining the influence of AI-generated content on students’ critical thinking skills and attitudes, emphasizing gender differences and the need for further research in these areas, and that libraries and librarians play a vital role in helping students develop critical thinking skills.

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Availability of data and materials
The data sets used and/or analysed during the study are available from the corresponding author.

Declaration of conflicting interests
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Author biographies

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Librarians’ role in the preservation and dissemination of indigenous knowledge

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Abstract
In the era of digital innovation, the preservation of indigenous knowledge stands at a compelling intersection of heritage and technology. Librarians play a crucial role in navigating the complexities of technology while respecting cultural protocols. Through a comprehensive exploration of librarian practices, this study sought to unpack how indigenous knowledge can be ethically preserved in the digital landscape. A qualitative study was conducted with 20 librarians in Zimbabwe, who were purposively selected. Interviews and observation were used to collect data, which was analysed using thematic content analysis. The findings reveal that libraries preserved indigenous knowledge in the form of poetry, folklore, drama and artefacts; demonstrated traditional dances; and sometimes recorded live sessions and special collections. The major challenges being faced were the ethical issues in documenting indigenous knowledge. It is recommended that librarians actively work with indigenous communities in indigenous knowledge projects to avoid resistance from knowledge holders.

Keywords
Indigenous knowledge, librarians, digital era, folklore, traditional dance, indigenous communities, knowledge holders, FAIR principles, CARE principles

Introduction
The IFLA (2010) recommends that libraries should preserve indigenous knowledge due to their importance in meeting most of the Sustainable Development Goals. In the digital era, the acquisition, preservation and dissemination of indigenous knowledge has undergone profound transformations. This evolution presents both challenges and opportunities for the safeguarding and promotion of indigenous knowledge, which holds immense cultural, historical and ecological significance for indigenous communities worldwide (Dlamini and Ocholla, 2018; Hovenga, 2022; Ngulube, 2002; Owiny et al., 2014). As gatekeepers of information and advocates of inclusive knowledge access, librarians play a pivotal role in facilitating the processes of acquiring, preserving and disseminating indigenous knowledge in the digital landscape (Afful-Arthur et al., 2022; Chigwada and Chiparausha, 2020; Chisita, 2011; Maina, 2012). Indigenous knowledge encompasses the accumulated wisdom, practices, beliefs and traditional know-how developed and passed down through generations within indigenous communities (Baporikar, 2022; Lodhi and Mikulecky, 2010). Rooted in intimate connections with nature, ancestral histories and cultural practices, indigenous knowledge forms the bedrock of their identities and social cohesion. However, this wealth of knowledge faces an array of threats in the face of globalization and the rapid advancement of digital technologies. Without proper attention to preservation and dissemination, irretrievable indigenous knowledge systems may be at
risk of erosion, dilution or even loss (Cámara-Leret and Bascompte, 2021; Lekhi, 2019; Reyes-García et al., 2013).

The digital era brings with it unprecedented opportunities for librarians to collaborate with indigenous communities in preserving and disseminating their cultural heritage. Digital repositories, online archives and innovative technologies can facilitate wider access to indigenous knowledge beyond geographical limitations (Hodder and Beckingham, 2022; Hunter, 2005; Stevens, 2008; Thumbadoo and Taylor, 2022). Nevertheless, this transformation also brings its share of challenges, and librarians must navigate these complexities with cultural sensitivity and ethical responsibility to ensure that indigenous knowledge is respected, protected and valued in the digital realm. As the role of librarians becomes increasingly multifaceted in the digital era, it becomes imperative to examine their contributions and limitations in the acquisition, preservation and dissemination of indigenous knowledge. Each indigenous community has its unique perspectives, needs and concerns, and the approach used in acquiring, preserving and disseminating indigenous knowledge must be adaptable and respectful of distinct cultural values and practices (UNESCO, 2010; United Nations, 2019, 2021a). The process should prioritize indigenous agency, self-determination and the long-term sustainability of the knowledge heritage.

The digital era has brought about some changes in the way indigenous knowledge is acquired, preserved and disseminated. The FAIR (findable, accessible, interoperable, reusable) guiding principles for scientific data management and stewardship were developed to facilitate the sharing of scientific data and support open access, as shown in Table 1 (Wilkinson et al., 2016). The FAIR principles deal with the reusability of data and enhancing the ability of machines to automatically find and use data (Carroll et al., 2020; Wilkinson et al., 2016). However, the movement towards open data did not fully consider indigenous peoples’ rights since the FAIR principles focus on facilitating increased data sharing (Global Indigenous Data Alliance, 2023). Indigenous communities were worried about how they could protect their rights and interests in indigenous data at the same time as supporting open data, machine learning, broad data sharing and big-data initiatives (Carroll et al., 2020). This created tension for indigenous peoples who were working towards greater control of the application and use of indigenous data for collective benefit, leading to the development of the CARE (collective benefit, authority to control, responsibility, ethics) principles for indigenous data governance. The CARE principles are people- and purpose-oriented, and describe how data should be treated to ensure that indigenous governance over data and its use are respected (Jennings et al., 2023). The CARE principles complement the FAIR principles in ensuring that data movements respect indigenous communities’ right to use data ethically (Carroll et al., 2020).

Librarians have been presented with the challenge of balancing the FAIR and CARE principles of data governance when working with indigenous knowledge in the digital era. The purpose of this study was to document the role of librarians in acquiring,

### Table 1. The FAIR and CARE principles.

<table>
<thead>
<tr>
<th>FAIR</th>
<th>CARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Findable</td>
<td>Collective benefit</td>
</tr>
<tr>
<td>Accessible</td>
<td>Data ecosystems shall be designed and function in ways that enable indigenous peoples to derive benefit from the data.</td>
</tr>
<tr>
<td>Interoperable</td>
<td>Authority to control</td>
</tr>
<tr>
<td>Reusable</td>
<td>Indigenous peoples’ rights and interests in indigenous data must be recognized and their authority to control such data should be empowered.</td>
</tr>
</tbody>
</table>

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Librarians have been presented with the challenge of balancing the FAIR and CARE principles of data governance when working with indigenous knowledge in the digital era. The purpose of this study was to document the role of librarians in acquiring,
preserving and disseminating indigenous knowledge in the digital era. It is against this background that the study sought to:

1. Identify the format of indigenous knowledge in the digital era;
2. Assess the role of libraries in the acquisition, preservation and dissemination of indigenous knowledge in the digital era in Zimbabwe;
3. Discover how librarians are implementing the FAIR and CARE principles of indigenous data governance;
4. Determine the challenges faced by libraries in the acquisition, preservation and dissemination of indigenous knowledge in the digital era in Zimbabwe.

Statement of the problem

Acquiring, preserving and disseminating indigenous knowledge in the digital era is a complex and sensitive process that requires collaboration, respect for indigenous communities’ rights and the use of appropriate technologies (Hunter, 2005; Mdhluli et al., 2021; Nakata et al., 2014; Stevens, 2008; United Nations, 2019). The preservation of indigenous knowledge must take into consideration emerging international trends, such as the open science movement, which led to the introduction of the FAIR and CARE principles of indigenous data governance. Therefore, the role of librarians in facilitating the acquisition, preservation and dissemination of indigenous knowledge is now more critical than before. However, the effectiveness of their involvement in indigenous knowledge preservation and the extent of their impact remain unclear, and the processes are presented with multifaceted challenges. Indigenous knowledge is also in danger of becoming extinct due to its oral nature (Maluleka and Ngoepe, 2018; Mdhluli et al., 2021; Ogar et al., 2020; Owolabi et al., 2022). Adeniyi and Subair (2013) note that African indigenous knowledge is poorly managed, and some of it disappears when the knowledge holders die. Therefore, this study aimed to unpack the overall role of librarians in promoting the preservation of indigenous knowledge and investigate the challenges faced by librarians in acquiring, preserving and disseminating indigenous knowledge in the digital era in Zimbabwe. Through a comprehensive examination of librarian practices and community engagement, this research sought to identify best practices, inform policy recommendations, and contribute to the advancement of inclusive and culturally sensitive information services in support of indigenous knowledge preservation and dissemination.

Formats of indigenous knowledge in the digital era

In the digital era, indigenous knowledge can be in various formats to ensure its preservation, accessibility and dissemination. The format chosen depends on the nature of the knowledge, the preferences of the indigenous communities and the resources available, and this has implications for open science. Indigenous knowledge can be in the form of digital texts, audio recordings, video recordings, photographs, digital artefacts and objects, interactive multimedia, digital maps, digital archives and repositories, and digital exhibitions and online collections (Abera, 2021; Dare, 2022; Masenya, 2022; Slade and Yoong, 2014). Indigenous knowledge can be documented in textual form, including traditional stories, myths, medicinal practices and historical accounts (Masango and Nyasse, 2015; Owusu-Ansah and Mji, 2013). Digitizing these texts preserves their cultural significance and allows for easy storage, search and retrieval. Oral traditions, songs, chants and storytelling can be audio-recorded to capture the nuances of spoken languages and preserve the richness of oral traditions. Video recordings can be used to capture cultural rituals, ceremonies, traditional performances and traditional knowledge transmission between generations. In that manner, photographs can document cultural practices, artefacts and the cultural landscape, providing a visual representation of indigenous knowledge and heritage (Marsden et al., 2010; Reitmaier et al., 2012; UNESCO, 2021). Artefacts and objects with cultural significance can be digitized to allow preservation and sharing with a broader audience, even if the physical objects are in specific museums or cultural centres. Interactive media applications such as virtual and augmented reality can be used to create immersive experiences that engage users with indigenous knowledge and cultural practices (Boboc et al., 2022; Giannini and Bowen, 2022; King et al., 2016; Nikonova and Biryukova, 2017; Skublewska-Paszkowska et al., 2022; UNESCO, 2020).

Libraries and cultural institutions create digital archives and repositories to store and organize various digital formats related to indigenous knowledge. Digital maps can also be used, where geospatial data and digital mapping technologies represent indigenous knowledge linked to specific locations such as sacred sites, hunting grounds and places of cultural significance (Cole and Hart, 2021; Olson et al., 2016; Thumbadoo and Taylor, 2022). Curating digital exhibitions and online collections helps showcase indigenous knowledge and cultural heritage to a global audience. Indigenous communities can also use social
media platforms and online forums to share knowledge, connect with others, and raise awareness about their culture and issues (Borrero, 2016; Kamakaila, 2021; Mkhize, 2014; Owiny et al., 2014). Customized knowledge management systems can also be developed to organize and structure indigenous knowledge according to the community’s cultural values and traditional classification systems. Indigenous language technologies, such as text-to-speech and speech-recognition systems, can also support the representation and preservation of indigenous languages in digital form (Galla, 2016; Meighan, 2021). However, it is important to note that the representation of indigenous knowledge in digital formats must be done in a culturally sensitive and respectful manner, with the involvement and consent of the indigenous communities. Libraries, archives and cultural institutions play a significant role in collaborating with indigenous communities to determine the appropriate formats and technologies to use while considering issues of intellectual property rights, data sovereignty and the long-term sustainability of digital resources.

Role of libraries in acquiring, preserving and disseminating indigenous knowledge

Libraries play a vital role in acquiring, preserving and disseminating indigenous knowledge in the digital era (Isah et al., 2012; Mbilinyi and Mwabungulu, 2020; Tjiek, 2006). In the acquisition of indigenous knowledge, libraries work in close partnership with indigenous communities to understand their knowledge needs, cultural protocols and preferences for knowledge sharing (Afful-Arthur et al., 2022; Kaya and Seleti, 2013; Mdhluli et al., 2021; Nakata et al., 2005). During this process, librarians look at ethical collection development by prioritizing ethical considerations, including free, prior and informed consent, when acquiring indigenous knowledge to ensure respectful representation and protection of cultural heritage. Libraries also digitize indigenous materials from their collections and collaborate with indigenous knowledge holders to collect and preserve digital materials that hold cultural significance (Balogun, 2023b; Boamah and Liew, 2017; Mdhluli et al., 2021).

As a way of ensuring the accessibility of indigenous materials, libraries use appropriate metadata standards and organization systems to ensure efficient discovery and access to indigenous knowledge (Chisa and Hoskins, 2016; Chowdhury et al., 2021; Gilman, 2006; Ruckstuhl, 2022). Librarians deal with the issue of data security and ethics when they implement data security measures to protect sensitive cultural information and adhere to ethical guidelines when managing indigenous knowledge (De la Porte and Higgs, 2019). Libraries participate in digital preservation efforts to safeguard indigenous knowledge from technological obsolescence and data loss (Balogun and Kalusopa, 2021; Maseny and Ngulube, 2019, 2021). Special collections are maintained, including rare materials, manuscripts and historical documents, preserving cultural and historical knowledge for future generations (Nilson and Thorell, 2018). Libraries also employ conservation practices such as proper storage conditions, handling protocols and repair techniques to ensure the long-term preservation of physical indigenous materials, safeguarding them from damage or degradation (Balogun and Kalusopa, 2021; International Centre, 2021; Iyishu et al., 2013).

Libraries disseminate indigenous knowledge through various avenues such as online access, open access initiatives, cultural protocols, community engagement and educational initiatives (Balogun and Kalusopa, 2022; Mdhluli et al., 2021; Mhlongo, 2020). They also promote open access to indigenous knowledge, aligning with the principles of open science and open education by respecting and adhering to the cultural protocols set by indigenous communities regarding the dissemination of sacred or sensitive knowledge while taking into consideration the FAIR and CARE principles of indigenous data governance (Carroll et al., 2020, 2022; Hayward et al., 2021; Mdhluli et al., 2021). Libraries also develop educational programmes and resources that incorporate indigenous knowledge, fostering cultural awareness and appreciation among library users and the broader public (Mdhluli et al., 2021; Mhlongo and Ngulube, 2018; Rivera, 2013). Libraries also offer advocacy and support when they call for the repatriation of digitized indigenous materials held in external collections to their respective communities (Anderson and Christen, 2013; Bell et al., 2013; Christen, 2011). In the process, libraries are working towards bridging the digital divide by providing technology access and training to indigenous communities, empowering them to engage with and utilize digital resources effectively.

Libraries take collaborative initiatives when they partner with indigenous institutions. Libraries collaborate with indigenous organizations, cultural centres and institutions to jointly preserve and disseminate indigenous knowledge (Kaya and Seleti, 2013; Malmer et al., 2020; Mhlongo, 2020; Sarkhel, 2016). They also support the development of community-based archives, enabling indigenous communities to manage and control their digital knowledge.
Implementation of the FAIR and CARE principles

The FAIR and CARE principles of indigenous data governance are essential frameworks for managing and sharing indigenous knowledge data (Carroll et al., 2020; Global Indigenous Data Alliance, 2023; Research Data Alliance, 2019). Librarians play a crucial role in ensuring that these principles are applied when acquiring, preserving and disseminating indigenous knowledge in the digital era. To make indigenous knowledge findable, librarians can ensure that the proper metadata is attached to indigenous data in order to assist indigenous communities and other researchers in identifying and retrieving relevant information (Balogun, 2023a; Farnel, 2020; Montenegro, 2019; Nakata et al., 2005). Indigenous knowledge should have a clear and accessible identifier that makes it easy to find and locate. Indigenous knowledge should also be accessible to both humans and machines as a way of promoting openness and transparency. Librarians can facilitate proper indigenous knowledge storage and sharing mechanisms which ensure that indigenous data remains accessible while respecting cultural protocols (Hayward et al., 2021; Mdluli et al., 2021; Nakata et al., 2005; Stevens, 2008). In the digital era, indigenous data should also be structured in a way that allows for easy integration with other data sets to enhance usability. Librarians can assist in standardizing data formats and metadata to enable seamless data integration. Reusability documents the need for indigenous knowledge to be well documented and properly licensed, enabling its reuse by others without restrictions. Librarians can ensure that indigenous data is documented comprehensively and that licensing respects indigenous intellectual property rights and community protocols (Oguamanam, 2020). However, it should be noted that it is still difficult to implement the FAIR principles regarding indigenous knowledge acquisition, preservation and dissemination since indigenous knowledge is communally owned, and some indigenous knowledge holders are not willing to document their knowledge, preferring to pass it on orally to the next generation.

The CARE principles apply more to indigenous knowledge preservation and can be easily implemented in the open science and digital era (Carroll et al., 2021). ‘Collective benefit’ involves prioritizing the well-being and advancement of indigenous communities. Librarians can work with communities to ensure that indigenous knowledge usage aligns with collective interests and benefits since indigenous knowledge is communally owned (Mdluli et al., 2021; Mhlongo, 2020). ‘Authority to control’ documents the need for indigenous communities to have control over their indigenous knowledge, including decisions on collection, storage, access and use. Librarians can act as advocates, ensuring that indigenous knowledge practices respect community decisions and consent (Mhlongo and Ngulube, 2018; Stevens, 2008). Librarians should also exercise ethical responsibility when handling indigenous knowledge and consider the potential impacts on communities and their cultural heritage. This involves transparency, informed consent and protecting sensitive information. Librarians should ensure that the collection, use and dissemination of indigenous knowledge aligns with ethical standards and community values (Chigwada and Ngulube, 2023; Mhlongo, 2020). They can facilitate conversations about the ethical implications of indigenous knowledge usage and assist in setting guidelines. Librarians, therefore, by virtue of their role as information professionals, are well positioned to uphold and promote the FAIR and CARE principles when dealing with indigenous knowledge, despite the challenges faced in the process (Mdluli et al., 2021).

Challenges faced by libraries in acquiring, preserving and disseminating indigenous knowledge

Acquiring, preserving and disseminating indigenous knowledge in the digital era comes with various challenges for libraries. Addressing these challenges requires a collaborative and community-oriented approach, with a strong emphasis on building trust, respecting cultural protocols, and empowering indigenous communities to play an active role in the preservation and dissemination of their knowledge. The challenges include cultural sensitivity and respect, access to indigenous communities, intellectual property and ownership concerns, the digital divide, language barriers, ethical considerations, copyright, data privacy and security, sustainability and long-term preservation, lack of funding and resources, lack of
expertise and the appropriateness of technologies (Chiwanza et al., 2013; Lwoga et al., 2011; McCarter et al., 2014; Mdhuli et al., 2021; Msuya, 2007; Ngulube, 2002; Okorafor, 2010; Owiny et al., 2014; Sithole, 2007). Libraries must approach indigenous knowledge with cultural sensitivity and respect for the beliefs, practices and protocols of indigenous communities. Failing to do so can lead to misunderstandings and conflicts that may hinder collaboration and knowledge sharing.

Gaining access to indigenous communities and knowledge holders can be challenging due to geographical isolation, language barriers and historical mistrust resulting from past exploitative practices (Luissetto, 2023; United Nations, 2021a). As a result, knowledge holders and community leaders may resist sharing their knowledge during the acquisition stage. Indigenous knowledge is often passed down through generations, and the concept of individual ownership may not align with the communal nature of this knowledge. Libraries may face challenges in determining who holds the right to share and disseminate certain information, and this requires clear communication and consent to deal with intellectual property and ownership concerns. Indigenous knowledge may not always fit neatly within conventional copyright frameworks (Okediji, 2018; Van Der Merwe, 2010). Libraries need to navigate copyright issues and seek permission to digitize and disseminate materials, which may involve complexities in understanding traditional knowledge systems. There is also the potential for misrepresentation and the risk of exploitation, since the digitization and dissemination of indigenous knowledge raises ethical questions regarding the appropriate use of such information (Christen, 2012; Scassa and Taylor, 2017; Torsen and Anderson, 2010; World Intellectual Property Organization, 2013).

There is also the issue of the digital divide, where many indigenous communities may lack access to reliable Internet connectivity and digital technologies, making it difficult to engage in digital preservation and access initiatives (Dutta, 2019; Mwanza, 2022; United Nations, 2021b). Language barriers can be a challenge since indigenous knowledge is often expressed in native languages that may not have standardized digital representations or character sets (Cosijn et al., 2002). As a result, libraries may face challenges in accurately representing and preserving indigenous languages in digital formats. Data privacy and security needs to be dealt with since preserving and disseminating indigenous knowledge digitally requires robust data privacy and security measures to protect sensitive cultural and sacred information from unauthorized access or misuse (Masenya, 2022; Mdhuli et al., 2021).

Libraries should work on the appropriateness of technologies when acquiring, preserving and disseminating indigenous knowledge. Libraries need to select technologies that align with the needs and values of the indigenous communities they work with (Mhlongo, 2020). Using inappropriate or intrusive technologies can undermine trust and collaboration. This goes hand in hand with the sustainability and long-term preservation of indigenous knowledge in the digital era. Libraries must ensure the long-term sustainability of digital repositories containing indigenous knowledge (Balogun, 2023a; Tjiek, 2006). This includes addressing challenges related to digital storage, data migration and technology obsolescence. However, some libraries may lack the expertise and cultural understanding required to curate and preserve indigenous knowledge appropriately. Collaboration with indigenous knowledge holders and experts becomes essential to bridging this gap. It has been noted that initiatives involving the acquisition, preservation and dissemination of indigenous knowledge require significant financial and human resources (Mdhuli et al., 2021). Libraries may struggle to secure adequate funding to support these initiatives effectively.

**Research methodology**

A qualitative study was carried out to investigate the role of libraries in the acquisition, preservation and dissemination of indigenous knowledge. Interviews and observation were employed as the data collection methods. A total of 20 librarians from special, public, school and academic libraries in Mashonaland West and Central were purposively sampled. The population consisted of 13 school libraries, four academic libraries, two special libraries and one public library. The special collections librarians in academic libraries were interviewed while those who managed the special libraries alone were the participants. School and teacher librarians were among the participants in the schools that had indigenous knowledge collections. Interviews were used as they enabled the researchers to follow up with questions as a way of seeking clarity from the participants. The interviews were recorded and then transcribed and coded according to the study objectives. Observation was then done to validate the results collected during the interview process. Visits to the libraries were carried out to assess how the librarians were acquiring, preserving and disseminating indigenous knowledge. The researchers looked at the indigenous knowledge...
collections in these libraries and how they were processed to enhance dissemination, and notes were taken during the observation. The data was analysed using thematic content analysis, where data was collected and analysed without preconceived categories or theories, and presented according to the objectives of the study.

Findings and discussion
The results of the observation are shown in Table 2.

Format of indigenous knowledge in the digital era
It was noted that all the libraries were involved in the acquisition, preservation and dissemination of indigenous knowledge. The indigenous knowledge collections in these libraries were in both electronic and print formats. They were regarded as other library materials when processing them. Cultural protocols were taken into consideration during the acquisition process, and the librarians only acquired what indigenous peoples were willing to share with them. The findings reveal that school and public libraries were preserving indigenous knowledge in the form of poetry, folklore, traditional dance and drama; special libraries exhibited artefacts and demonstrated and recorded traditional dances and music; and academic libraries documented and preserved indigenous knowledge in special collections. This is in line with the studies by Abera (2021), Dare (2022), Marsden et al. (2010), Masenya (2022), Reitmaier et al. (2012) and UNESCO (2021a), which indicate that libraries are preserving and disseminating indigenous knowledge in the digital era. The special and academic libraries participated in audio and video recordings, where they visited indigenous knowledge holders after getting permission from the village headmen or chiefs to acquire the indigenous knowledge in line with the CARE principles. In academic libraries, those institutions that offered indigenous knowledge as part of the curriculum worked with researchers to acquire indigenous knowledge, which was then used as sources of information. The indigenous collections were in the form of scripts of the recordings made by researchers, and these librarians worked with other libraries to ensure that their researchers could access the indigenous knowledge materials needed.

In some cases, indigenous knowledge was acquired through purchases or donations in both print and electronic formats. The indigenous knowledge collections in all the libraries included poetry, proverbs, novels, artefacts, idioms and folklore, and the academic

<table>
<thead>
<tr>
<th>Activities</th>
<th>Academic libraries</th>
<th>Public library</th>
<th>School libraries</th>
<th>Special libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Talks with indigenous knowledge holders</td>
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<td>7</td>
<td>2</td>
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<tr>
<td>Video and audio recordings</td>
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<tr>
<td>Folklore</td>
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<td>Artefacts</td>
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<td>Books</td>
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<td>13</td>
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<td>Encouraging researchers to write</td>
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<td>4</td>
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<td>Preservation</td>
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<td>Drama</td>
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<td>Traditional songs</td>
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<td>Traditional dances</td>
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<tr>
<td>Special indigenous knowledge collection</td>
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<td>Artefacts in galleries</td>
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<td>Scripts of recordings</td>
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<td>Reading indigenous knowledge stories to patrons</td>
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<td>Listening to radio and television programmes</td>
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<td>Library catalogues</td>
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<td>0</td>
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<td>Web portals</td>
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Table 2. Observation of libraries with regard to the acquisition, preservation and dissemination of indigenous knowledge.
libraries subscribed to electronic resources on indigenous knowledge. This supports the sentiments of Afful-Arthur et al. (2022), who indicate that academic libraries make indigenous knowledge accessible for national development. A librarian from the school library supported what was observed in terms of how indigenous knowledge was being acquired and disseminated by stating:

We invite elders to come and do storytelling sessions and folklore as a way of teaching the learners about indigenous knowledge within the community, and transfer the knowledge to the young ones so that they can teach the coming generations. Sometimes, during library time, we play recorded radio sessions that were done by the elders to showcase their indigenous knowledge.

This shows that the libraries were utilizing technology to acquire, preserve and disseminate indigenous knowledge in the digital era (see also Boboc et al., 2022; Giannini and Bowen, 2022; King et al., 2016; Nikonova and Biryukova, 2017; Owolabi et al., 2022; Skublew ska-Paszkowska et al., 2022; UNESCO, 2020).

Role of libraries

The findings of the study reveal that the role of libraries in the acquisition of indigenous knowledge involved holding talks with experts and elders, video and audio recordings, folklore, artefacts and books, and encouraging researchers to write about indigenous knowledge within their communities. This is supported by Balogun (2023b), Boamah and Liew (2017), and Mdhluli et al. (2021), who state that libraries collaborate with indigenous knowledge holders to preserve indigenous materials that are culturally significant. It was noted that libraries that acquired indigenous knowledge were involved in its preservation, where the librarians ensured that the collection was safe, just like any other collection in the library. One of the school librarians pointed out: ‘We encourage learners to memorize poems, dramas, and traditional songs as a way of preserving indigenous knowledge’ – and this was in line with what was observed during the study.

A librarian from a special library indicated that they had a special collection for indigenous materials that was easily accessible, and artefacts were preserved in the gallery where people could view them and learn about the indigenous knowledge within the community. This is in line with Nilson and Thorell’s (2018) study, which points out that indigenous knowledge special collections were maintained in libraries. The findings reveal that indigenous knowledge in school libraries was preserved through memorizing poems, performing dramas on the traditions of the community, singing traditional songs, doing traditional dances and having a special collection of indigenous materials for learning purposes. The academic libraries had repositories and digital collections on indigenous knowledge, scripts of recordings done by researchers and special collections on indigenous knowledge, and they used digital libraries (see also Balogun and Kalusopa, 2021; Masenya and Ngulube, 2021).

It was found that the school and public libraries conducted storytelling sessions by inviting indigenous knowledge holders from the community to share folklore and stories as a way of disseminating their knowledge. Indigenous knowledge was also shared in class, where indigenous stories were read and, in some instances, learners were sent to the library to read ngano (fairy tales) and then come back to recite the stories in class and point out the lessons learned. Indigenous knowledge in school libraries was also disseminated using live radio and television sessions. Supporting what was observed during the study, one school librarian commented: ‘We invite learners to listen to live radio sessions and watch television sessions when indigenous communities are performing as a way of educating the learners and passing on the indigenous knowledge to the next generation during this digital era’. It was noted that libraries also disseminated indigenous knowledge materials by organizing the information sources and making them accessible via online public access catalogues. These catalogues guide users when they are looking for sources of material on indigenous knowledge. This is supported by the research of Balogun and Kalusopa (2022), Mdhluli et al. (2021) and Mhlongo (2020), which notes that libraries were utilizing information technology to enhance the dissemination of indigenous knowledge. Special libraries facilitated exhibitions and displays of indigenous materials, and held live events that were recorded with the consent of the indigenous communities and those who were performing the shows, such as traditional dances, poems and traditional music. Therefore, the dissemination of indigenous knowledge in the digital era was done through storytelling sessions that were recorded, reading indigenous knowledge stories, listening to radio and television indigenous knowledge sessions, exhibitions at events, and library catalogues and websites. However, none of the libraries were working on advocacy towards the repatriation of indigenous collections to their own communities, contrary to what is pointed out by Anderson and Christen (2013), Bell et al. (2013) and Christen (2011).
Implementation of the FAIR and CARE principles

The findings reveal that all of the librarians were implementing the FAIR principles by ensuring that the indigenous knowledge collections they had in their libraries were accessible and findable through the classification and cataloguing processes that were undertaken after the acquisition process (see also Balogun, 2023a; Farnel, 2020; Montenegro, 2019; Nakata et al., 2005). In the academic and special libraries, indigenous knowledge materials were findable via catalogues and accessible through institutional repositories and web portals. In the school libraries, they concentrated more on preservation, where they encouraged learners to memorize indigenous knowledge practices and participate in traditional dances and music. The librarians stated that their main aim was to ensure that indigenous knowledge was accessible to learners and other researchers who were interested in the subject, which confirms the FAIR principles as pointed out by Carroll et al. (2021).

It was noted that the librarians who were involved in the acquisition of indigenous knowledge were collaborating closely with indigenous communities to ensure that indigenous knowledge was managed in a way that respected cultural sensitivity, preserved heritage and supported community aspirations (see Carroll et al., 2020; Global Indigenous Data Alliance, 2023; Research Data Alliance, 2019). The librarians were balancing technological advancements, ethical considerations and community engagement to ensure that the use of their indigenous collections was in line with ethical standards and guidelines (see Chigwada and Ngulube, 2023; Mdhuli et al., 2021; Mhlongo, 2020). They were working on providing guidance and expertise for the ethical preservation and sharing of indigenous knowledge in the digital era, taking into consideration the FAIR and CARE principles.

Challenges faced by libraries

The findings show that the libraries had been facing various challenges in the acquisition, preservation and dissemination of indigenous knowledge in the digital era. The major challenges faced by all the libraries included the issue of technology, which is ever changing, and the lack of resources needed to implement successful indigenous knowledge projects. As one of the academic librarians pointed out:

because of technological obsolescence, it is difficult to manage indigenous knowledge collections, and this has affected the accessibility of some of the recorded sessions. However, efforts are always made to ensure that the content is migrated to new sources when there is an upgrade in hardware or software.

The issue of technological obsolescence as a challenge in indigenous knowledge management is noted by Balogun and Kalusopa (2021), the International Centre for the Study of the Preservation and Restoration of Cultural Property (2021), and Masenya and Ngulube (2021), confirming the need to ensure that hardware and software are always compatible, and thereby avoiding the loss of indigenous collections. The issue of security came up in all the libraries when dealing with indigenous knowledge in the digital era. They indicated that some of the library materials might be stolen, or the system might crash or be attacked by a virus, leading to the loss of content. In order to deal with this challenge, the librarians indicated that they carried out backup procedures to ensure that the content was always accessible when needed.

During the acquisition process, the librarians indicated that they faced resistance from some indigenous knowledge holders, who were not willing to share their indigenous knowledge, especially if they knew that it was being recorded. One academic librarian indicated:

The knowledge holders were afraid of the abuse of their indigenous knowledge as well as losing their intellectual property rights during the acquisition process. As a result, we started by building trust with the indigenous communities and seeking their consent, especially when the recording was involved.

It was noted that the librarians sought permission to engage with the indigenous communities from the village elders and leaders before going to the knowledge holders. In all instances, the librarians were not working alone on these processes but were collaborating with researchers to ensure that they obtained the content for preservation and dissemination. However, they pointed out the lack of financial resources to ensure that all of the systems were in place to acquire, preserve and disseminate indigenous knowledge, since some of the equipment needed was beyond the reach of many libraries (see Mdhuli et al., 2021).

It can be noted that the library and information professionals were well versed in the ways of acquiring, preserving and disseminating indigenous knowledge in the digital era (see also Afful-Arthur et al., 2022; Mdhuli et al., 2021). The librarians showed that they had the capacity to engage with knowledge holders who were willing to make their indigenous knowledge accessible. However, it was noted that the
biggest challenge hampering indigenous knowledge management in libraries was the unavailability of the resources that were needed to make this knowledge available. This is in line with the studies by Chiwanza et al. (2013), Lwoga et al. (2011), McCarter et al. (2014), Mdhluli et al. (2021), Msuya (2007), Okorafor (2010), Owiny et al. (2014) and Sithole (2007). It was also noted that there is a need to deal with intellectual property rights issues when working with indigenous knowledge in the digital era. If libraries have indigenous knowledge repositories, indigenous communities should be actively involved in the management of these repositories as a way of encouraging ownership among the knowledge holders. Therefore, the CARE principles are more applicable to the preservation of indigenous knowledge, and it is difficult to make use of the FAIR principles in their entirety since some indigenous communities are not willing to share their indigenous knowledge. However, the libraries that were part of this study were utilizing both sets of principles since they provided access to all the indigenous collections in their holdings. The reusability component of the principles was the only drawback, since the indigenous objects were unique to the indigenous communities.

**Limitations of the study**

This study documented the role of librarians in Zimbabwe, and it might be difficult to generalize the results to incorporate what is happening in other countries. Their roles might be country-specific, and it is therefore important to carry out other studies to document how libraries in other countries are contributing to the acquisition, preservation and dissemination of indigenous knowledge in the digital era.

**Conclusion and recommendations**

In conclusion, it can be noted that librarians play a critical role in the acquisition, preservation and dissemination of indigenous knowledge in the digital era through various formats and activities. Indigenous knowledge is being preserved in different formats, which mostly suit the location of the library and the resources available. The digital landscape has revolutionized the methods of knowledge preservation and dissemination, presenting both challenges and opportunities for safeguarding the cultural heritage of indigenous communities. Therefore, librarians act as bridge-builders between traditional knowledge systems and the digital world. Their collaboration with indigenous communities has been instrumental in understanding cultural protocols and the aspirations of knowledge holders. The FAIR and CARE principles are being adhered to by librarians who acquire, preserve and disseminate indigenous knowledge. However, in undertaking this process, librarians face technological challenges, which are ever changing, and they have to ensure that the digitized content is always accessible.

The authors recommend the need for collaboration between librarians and indigenous communities so that librarians work closely with knowledge holders from the start. Collaborative partnerships ensure that the process is inclusive and respectful, and that the knowledge is shared with the community’s consent and ownership. Librarians should also adhere to ethical guidelines, such as those provided by IFLA (2010) and the FAIR and CARE principles of indigenous data governance. This involves respecting the intellectual property rights of indigenous knowledge holders and ensuring that access to sensitive knowledge is controlled appropriately. Libraries should be actively involved in the digital preservation of indigenous knowledge through the capture of audio and video recordings, and the utilization of appropriate metadata standards for organization and discovery. However, librarians cannot do this alone; there is a need for a coordinated approach at the national level to include all stakeholders in indigenous knowledge management. Libraries should invest in capacity building for indigenous communities to enable them to manage their digital knowledge repositories effectively and sustainably. If libraries are providing access to indigenous knowledge, they must be sensitive to cultural protocols and restrictions on certain knowledge. Implementing access controls and community-specific guidelines can help protect sacred and restricted knowledge. Libraries should also collaborate with researchers, anthropologists and other experts to ensure the accurate representation and contextualization of indigenous knowledge in the digital era. Moreover, library schools should teach how technologies can be used to acquire, preserve and disseminate indigenous knowledge as a way of educating the librarians who will be responsible for indigenous knowledge management. Librarians should also work with the relevant ministry on the development and maintenance of a database that documents indigenous knowledge in Zimbabwe. The resuscitation revival of the Zimbabwe Resource Centre for Indigenous Knowledge or the establishment of a new organization to assist in the management of indigenous knowledge in Zimbabwe would be instrumental in the acquisition, preservation and dissemination of indigenous knowledge in the digital era.
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Professional qualifications, accreditation, and certification in library and information science schools: A global perspective

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Abstract
Library and information science schools and their accreditations play a crucial role in preparing individuals to become effective and competent library and information professionals. A number of efforts have been undertaken to analyze the accreditation standards and procedures for library and information science professionals in a specific context (e.g. country). However, there is limited research from a global perspective. This article provides an overview of the qualifications of library and information science professionals and accreditation and certification in library and information science schools around the world. A non-probability sampling strategy was employed to collect all this information. A total of 586 programs (e.g. undergraduate) from 198 library and information science schools in 69 countries was represented. The results show that an accredited national degree was the most required credential to work as a professional librarian in the field. Master’s degree programs appeared to be the most commonly offered degree programs at these schools, and English was the most popular language of instruction in all degree programs.

Keywords
Credentialing, accreditation, degree programs, information professionals, library science, information science

Introduction
The world of library and information science (LIS) is a diverse and ever-changing field. Where once it was easy simply to find a job as a librarian, in today’s society, that has become a significantly more complex process. In today’s information society, the LIS field has adapted to the current needs of the field by offering a greater diversity of specializations and skill sets (e.g. see Bird, 2021; Raju, 2020). One of the repercussions of this adaptation is a greater diversity of specializations and skill sets being offered academically. While this certainly enriches the field and strengthens the career prospects for LIS students, it also poses an additional challenge to employers to find employees with the specific skill sets needed to

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be successful at the job. It also creates an additional challenge for incoming students as they often have chosen a specific career path and need a specific skill set to be successful within that career. Unfortunately, few broad-ranging tools are currently available for use by prospective employers or future students. This study is reflective of the mapping project designed by the Building Strong Library and Information Science Education (BSLISE) Working Group (n.d.), an initiative of the IFLA Education and Training Section, LIS Education in Developing Countries Special Interest Group, and Library Theory and Research Section. This project was designed to provide employers and students with an accessible tool to find LIS schools that will teach the skill sets each group needs to succeed in the global information economy. In addition, the job market is becoming even more diverse, as more programs develop undergraduate degrees in a field that in North America has been strictly a graduate-degree field (American Library Association, 2023; Hamlin, 1981). This does allow for greater reciprocity with countries that have focused primarily on undergraduate education within the LIS field, such as China in the early 1990s (Xue et al., 2019). However, it presents a greater challenge for employers to find what level of degree is needed for a successful job candidate, and for a prospective student looking for career options in the global marketplace.

In addition, while English is regarded as the global business language (Neeley, 2012), no such global language is recognized within academic institutions. Many countries have a large diversity of languages spoken within their boundaries, as well as an even larger diversity of languages spoken around them. This linguistic diversity can present a challenge to international students who may not have access to particular skill sets within their home country but may also be unable to gain fluency in an additional language to the level needed to succeed at the academy within a given time frame.

The LIS world is becoming ever more interconnected and globalized. The demand for data analysis experts and information professionals continues to grow, with the Bureau of Labor Statistics (n.d.) forecasting a growth rate of almost 10% through 2026 in the USA alone. The knowledge, skills, and abilities of LIS professionals have also diversified with the digital age (Yadav, 2021). However, no common certification is recognized globally, making professional movement globally a challenge. In addition, research on the credentialing of information professionals internationally is somewhat sparse. Most studies focus primarily on the requirements within their specific country rather than an overarching review internationally. The primary reason for this is the disparity in requirements globally. LIS is a general term, encompassing skill sets that range from traditional library work to business skills, such as marketing and management, to technology skills. LIS schools and their accreditations play a crucial role in preparing individuals to become effective and competent library and information professionals. A number of efforts have been undertaken to analyze the accreditation standards and procedures for LIS professionals in a specific context (e.g. country). However, there is limited research from a global perspective. This study aims to focus on procedures that address issues of the qualifications of LIS professionals and accreditation and certification in LIS schools around the world.

**Literature review**

The range of skills within the LIS field has become diverse between countries. However, no specific research on how to obtain those various skills has been explored. While similar processes in professional certification are available, there are even more differences, which presents a challenge for international recognition (Chu and Raju, 2018: 4).

In the USA, the Bureau of Labor Statistics defines a librarian as a person who can help people find information and conduct research for personal and professional use. Their job duties may change based on the type of library they work in, such as public, academic, and medical libraries. Librarians typically need a master’s degree in library science. Some positions have additional requirements, such as a teaching certificate or a degree in another field. (Bureau of Labor Statistics, n.d.)

However, several undergraduate programs are currently in place in the USA, with more being developed, which is changing some of the discussion toward what degree should be required to be considered a professional librarian. In addition, there is some reciprocity between the USA, Canada, and Europe, indicating that similar qualifications exist. Although a variety of degree types are awarded internationally, research has found that mostly informal agreements, along with some formal agreements, are what preserves international cooperation and the reciprocity of LIS degrees (Abdullahi et al., 2007: 18).

In Australia, one can become a librarian by obtaining a Master’s or an undergraduate degree.
In 2018, there were 10 Higher Education institutions offering 23 ALIA [Australian Library and Information Association] accredited courses, including Master’s, Bachelor and Graduate Diploma. There were two universities, 14 TAFEs [technical and further education institutes] and one private RTO [registered training organization] offering the 17 ALIA accredited Diploma of Library and Information Services courses, making a total of 27 accredited institutions and 40 accredited courses. (Australian Library and Information Association, 2018)

In China, there is a diversity of paths that can be taken to achieve a position as a librarian. This could be an undergraduate or graduate degree, with many positions titled as “librarian” being a paraprofessional position. Xue et al. (2019) state that prior to the turn of the 21st century, Chinese LIS education was focused on undergraduate studies, whereas today, a Master’s degree is much more common, with PhD programs also being developed throughout the country.

Europe is also somewhat of a blend in terms of accreditation. Librarianship may be pursued at the Bachelor’s or Master’s level in the UK, for example (Marcella and Oppenheim, 2020). However, in recent years, there has been a proliferation of unaccredited undergraduate information management courses in the UK, which poses a serious risk to the continuation of LIS education. An IFLA working group documented that developing an international framework for accreditation and certification is a challenging task even though “similarities in professionalization and certification in LIS can be found across countries and regions” (Chu and Raju, 2018: 4).

Similarly, in Eastern Europe (EE) and some former Soviet Union (FSU) countries, there were several paths whereby a person could become a librarian:

As early as 1994, EE/FSU countries made a concerted effort “to follow international trends” in LIS education, encouraging schools of library and information science to “develop an appropriate level” in such areas as information technologies, information management, marketing, and user education. (Dali and Dilevko, 2007: 85)

Currently, one of the most comprehensive listings and descriptions of LIS education is available in the World Guide to Library, Archive and Information Science Education, edited by Axel Schniederjürgen (2007). This volume, which was released by IFLA in 2007, lists over 900 institutions globally, with information specifically on LIS programs. In addition, BSLISE, an IFLA working group, has identified interesting trends in LIS education (see Table 1).

The work by the IFLA BSLISE Working Group (Chu and Raju, 2018) is currently one of the more comprehensive works underway. However, there are still additional questions remaining concerning LIS education and its manifestations internationally. As Dalton and Levinson (2000) stated: “most importantly it was discovered that professional accreditation of LIS courses by professional bodies was extremely rare, occurring in only a small proportion of countries.” Unfortunately, not much further research has been carried out following Dalton and Levinson’s (2000) initial findings.

A lack of exposure to international experiences can be a limiting factor for students in furthering their educational and professional goals (Bird et al., 2015; Hendershot and Sperandio, 2009). Without a background in travel and international experience, the default for most students will be a local choice, whereas a national or international option might better fit the needs of students. In addition, employers often do not have the resources necessary to make an informed decision on reciprocity when it comes to LIS degrees and certifications, except for university rankings, which do not entirely represent LIS programs (Lund et al., 2019). As Hotho (2008) discusses how the LIS world has looked for methods to ensure its professional boundaries and Wiggins and Cannon (2013), as well as Jordan (2019), discuss some of the challenges presented to new professionals trying to enter the workforce, this boxing-in of the profession often makes it challenging to look outside of local or regional expectations. Internships can often provide greater exposure to international opportunities, but there is still a dearth of availability of virtual internships (Bird et al., 2015). These virtual internships can provide both employers and students with a global perspective and offer greater job opportunities for both parties.

Methods
This study focused on the procedures that address professional qualifications, accreditation, and certification for the professional practices of LIS professionals worldwide. In the context of this study, LIS is defined as the study of information in all its formats and processes, the technologies used to interact with information, and the nature of human interaction with information and technology in all society. It is also a professional field that engages all aspects of the information life cycle, utilizes appropriate technologies to connect people to information anywhere, and is practiced in public or private cultural heritage institutions (e.g. libraries, archives, museums), information
centers, and workplaces, among others. LIS education and research is conducted in universities or other academic institutions offering degree (undergraduate and graduate) and non-degree programs, in units that are at the level of a school, college, or faculty, a subunit such as a department, or an organized degree program within

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<th>Trends</th>
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<tr>
<td>In the Gulf Cooperation Council countries, four countries offered</td>
<td>Rehman (2008)</td>
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<td>undergraduate LIS programs (Kuwait, Oman, Qatar, and Saudi Arabia),</td>
<td>American Library Association</td>
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<td>with three countries (Kuwait, Oman, and Saudi Arabia) offering a</td>
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<td>There are currently 64 programs accredited by the American Library</td>
<td>Park (2004), Ueda et al. (2005)</td>
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<td>Association in the USA, Puerto Rico, and Canada, including eight</td>
<td>Khoo et al. (2003), Majid et al. (2002), Sacchanand (2015)</td>
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<td>programs in Canada and a program at the University of Puerto Rico.</td>
<td>Juznic and Badovinac (2005), Khoo et al. (2003), Lorring and Kajberg</td>
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<td>In Africa, 50 LIS schools offer LIS credentials from the certificate</td>
<td>Australian Library and Information Association (2018)</td>
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<td>to the doctoral level. In central, southern, and eastern Africa, 75</td>
<td>Chu and Raju (2018)</td>
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<td>undergraduate, 26 Master’s, and 16 doctoral programs were counted.</td>
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<td>Saka et al. (2018) remark on the proliferation of LIS in Nigeria,</td>
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<td>emphasizing the need for quality control.</td>
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<td>In China, there were over 50 schools of information science and/or</td>
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<td>information management. Japan and South Korea offered LIS programs</td>
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<td>at both the graduate and undergraduate levels.</td>
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<td>Six of the 10 member countries of the Association of Southeast Asian</td>
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<td>Nations offered LIS education (Indonesia, Malaysia, the Philippines,</td>
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<td>Singapore, Thailand, and Vietnam). Four of the eight member countries</td>
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<td>of the South Asian Association for Regional Cooperation offered LIS</td>
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<td>education (India, Pakistan, Bangladesh, and Sri Lanka) at the</td>
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<td>certificate, undergraduate, and graduate levels.</td>
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<td>Majid et al. (2002), after analyzing data from 144 LIS programs in</td>
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<td>five countries (Singapore, Malaysia, Thailand, Indonesia, and the</td>
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<td>Philippines), proposed Congress of Southeast Asian Librarians (CONSAL),</td>
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<td>a model of accreditation for Southeast Asian nations. Similarly,</td>
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<td>Khoo et al. (2003) compare the core skills and competencies specified</td>
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<td>by the Chartered Institute of Library and Information Professionals</td>
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<td>and the Australian Library and Information Association, and discuss</td>
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<td>their potential use in the Southeast Asian context.</td>
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<td>Singapore, Thailand, and Vietnam). European LIS education consisted</td>
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<td>develop a common conceptual framework for defining core elements in</td>
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<td>the LIS curriculum as a basis for enhancing the mobility of the</td>
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<td>programs at the undergraduate and graduate (Master’s and doctoral)</td>
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<td>website in 2017 identified over 70 institutions that offer LIS</td>
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<td>programs in Latin America and the Caribbean, which account for over</td>
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<td>100 programs at the undergraduate level and more than 50 Master’s</td>
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<td>degree programs. Brazil accounts for 34 of these graduate programs</td>
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<tr>
<td>(Coordination for the Improvement of Higher Education Personnel).</td>
<td></td>
</tr>
<tr>
<td>In the Indian context, a brief overview of the present status and</td>
<td></td>
</tr>
<tr>
<td>problems of LIS education in Indian universities is indicated, with</td>
<td></td>
</tr>
<tr>
<td>an emphasis on the need for its internal quality assurance and</td>
<td></td>
</tr>
<tr>
<td>accreditation by an external agency.</td>
<td></td>
</tr>
</tbody>
</table>
a department or school. The professional qualification to work as a LIS professional is framed in terms of the academic preparation or training needed to practice or work as a professional librarian. Certification is defined as authoritative validation of the competencies necessary to practice or work as a professional librarian. Accreditation refers to assessment of the academic unit (e.g. school, department, or program) offering LIS degree programs by an external organization.

An online questionnaire was developed by an international team of scholars and professionals and reviewed rigorously to minimize potential misinterpretation issues. The questionnaire was pilot-tested at the 2019 IFLA World Library and Information Congress and additional feedback was solicited prior to its finalization. The formal dissemination of the questionnaire commenced on 28 October–31 December 2019. A non-probability sampling strategy was employed due to the lack of a suitable list of schools and contacts as a sampling frame. The questionnaire was actively promoted by members of the IFLA BSLISE Working Group in their respective geographical areas of interest and connections, including regional, national, and international mailing lists. The invitation email briefly described the type of information collected via the questionnaire to help respondents self-identify to participate in the study. Multilingual contacts in five of the seven IFLA official languages (Arabic, Chinese, French, Russian, and Spanish) and an additional two languages (Portuguese and Turkish) were included in the invitation to assist the participants as questions arose. Since the research group did not have access to a German-speaking contact, a German-language contact was not included in the invitation. Additionally, platforms such as the 2021 and 2022 IFLA World Library and Information Congress and BSLISE webinars and newsletters were used to solicit participation in the questionnaire. Since this study is part of a larger project that is aimed at developing a regularly updated international database and asset map about LIS schools and programs around the world, the data collection process has continued. The results presented in this article are based on data collected from 28 October 2019 to 9 September 2021. A total of 198 unique LIS schools from 69 countries on six continents were represented in the data set (see Figure 1).

**Limitations**

The invitation method of the survey and the language of the questionnaire (English) might have resulted in a bias toward western countries. The number of responses obtained was limited and, thus, the results and conclusions may not be representative for all LIS schools. In addition, the survey remained open for a two-year period and, although many efforts were
undertaken to disseminate the survey worldwide, the limitations remarked affected the number of responses, leaving some schools out of the sample. In addition, the questionnaire did not define “professional librarian,” as many countries typically define the term differently (Chu and Raju, 2018). This may have skewed the results as respondents may have submitted answers based on criteria that applied to their own context.

**Results**

A large majority of the participants (82.3\%, \( n = 163 \)) from 69 countries indicated that a type of credentialing (e.g. certificate, undergraduate degree) is required to work as a professional librarian and an accredited national degree is the most required credential (70.2\%, \( n = 139 \)). Although a definition of the field of LIS was included in the survey to provide a framework for the study, no definition for “professional librarian” as a title was provided in the questionnaire. Therefore, the respondents interpreted it based on their own context (see Figure 2).

A total of 586 non-degree (e.g. certificate, diploma, associate), undergraduate, specialist or professional, Master’s, post-Master’s, and doctoral degree programs were reported. The most frequently offered degree by the schools participating in the study was a Master’s degree. About 34\% (\( n = 198 \)) of the programs offered by 190 LIS schools were at the Master’s level (see Figure 3). A list of the degree programs broken down by country is available in Appendix 1.

The schools that listed their degree programs were asked a series of questions about each of their degree programs from the admission requirements, program
TABLE 2. Descriptive statistics for non-degree programs.

<table>
<thead>
<tr>
<th>Admission requirements</th>
<th>n</th>
<th>%</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior degree</td>
<td>21</td>
<td>58.3</td>
<td>31.3</td>
</tr>
<tr>
<td>Minimum grade</td>
<td>15</td>
<td>50</td>
<td>7.5</td>
</tr>
<tr>
<td>Program focus</td>
<td>49</td>
<td>63.3</td>
<td>30.7</td>
</tr>
<tr>
<td>Library and information science/studies</td>
<td>6.1</td>
<td></td>
<td>3.7</td>
</tr>
<tr>
<td>Archival management/science/studies</td>
<td>8.2</td>
<td></td>
<td>4.9</td>
</tr>
<tr>
<td>Information management or science</td>
<td>12.2</td>
<td></td>
<td>7.6</td>
</tr>
<tr>
<td>Library science</td>
<td>10.2</td>
<td></td>
<td>6.4</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td>3.8</td>
</tr>
<tr>
<td>Program modality</td>
<td>49</td>
<td></td>
<td>30.7</td>
</tr>
<tr>
<td>Face-to-face</td>
<td>51</td>
<td></td>
<td>32.4</td>
</tr>
<tr>
<td>Distance/online</td>
<td>28.6</td>
<td></td>
<td>17.7</td>
</tr>
<tr>
<td>Hybrid (face-to-face and distance/online)</td>
<td>20.4</td>
<td></td>
<td>12.8</td>
</tr>
<tr>
<td>Time to completion</td>
<td>48</td>
<td></td>
<td>30.7</td>
</tr>
<tr>
<td>≤ 12 months</td>
<td>41.7</td>
<td></td>
<td>26.5</td>
</tr>
<tr>
<td>13–24 months</td>
<td>31.3</td>
<td></td>
<td>19.8</td>
</tr>
<tr>
<td>25–36 months</td>
<td>18.8</td>
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<td>12.1</td>
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<tr>
<td>36 months +</td>
<td>8.3</td>
<td></td>
<td>5.3</td>
</tr>
<tr>
<td>Geographical distribution</td>
<td>72</td>
<td></td>
<td>45.8</td>
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<tr>
<td>Europe</td>
<td>27.8</td>
<td></td>
<td>17.7</td>
</tr>
<tr>
<td>Asia</td>
<td>22.2</td>
<td></td>
<td>14.4</td>
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<tr>
<td>Africa</td>
<td>22.2</td>
<td></td>
<td>14.4</td>
</tr>
<tr>
<td>North America</td>
<td>15.3</td>
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<td>9.8</td>
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<tr>
<td>Oceania</td>
<td>12.5</td>
<td></td>
<td>8.0</td>
</tr>
<tr>
<td>External accreditation</td>
<td>48</td>
<td>37.5</td>
<td>29.7</td>
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<tr>
<td>External partners</td>
<td>48</td>
<td>35.4</td>
<td>23.9</td>
</tr>
<tr>
<td>Student population</td>
<td>37</td>
<td>9164</td>
<td>59.2</td>
</tr>
<tr>
<td>Graduation requirement</td>
<td>48</td>
<td>47.9</td>
<td>31.3</td>
</tr>
</tbody>
</table>

*Sum of the results may exceed 100% as respondents were allowed to choose multiple answers.*

foci, and modalities to language(s) of instruction and accreditation status. The respondents could identify up to three languages of instruction for their programs. The results below are categorized by the types of degree program as shown in Figure 3.

Non-degree programs
Seventy-two non-degree programs were reported by 49 LIS schools in 33 countries. A program that grants a certificate, diploma, or associate degree is considered as a non-degree program in the context of this study. Descriptive statistics for these non-degree programs are presented in Table 2. These programs often stipulated a prior degree (58.3%, n = 21) and a minimum grade point (50%, n = 15) of average from a prior degree as admission requirements. A large majority of these non-degree programs (63.3%, n = 31) had library and information science/studies as their primary focus. Face-to-face (51%, n = 25), distance/online (28.6%, n = 14), and hybrid (20.4%, n = 10) modalities were used to deliver instruction in these programs.

At the time of data collection, 9164 students, both part-time and full-time, were enrolled in these programs. English as a language of instruction (54.5%, n = 30) was quite common in these programs, followed by French (7.3%, n = 4) and Russian (7.3%, n = 4). The remaining languages are listed in Appendix 2. About one-third of the programs (n = 24) responded to a question about a curriculum update, and almost 70% (n = 17) of these programs indicated that their curriculum was updated in 2018 or later. About 48% (n = 23) of the programs had a graduation requirement (e.g. final paper or similar, thesis, dissertation, examination, portfolio, practicum), and a large majority of the students in these programs (73%, n = 35) completed the required coursework within two years.

Only 37.5% (n = 18) of these non-degree programs had external accreditation and 76.5% (n = 13) of these accredited programs were accredited only by a national organization. The rest were accredited by an international accrediting organization that operated outside of the program’s home country. About 35% (n = 17) of the non-degree programs had an external partner, including academic programs and professional organizations outside of their institutions. Although about half of these programs (53%, n = 9) had external partner(s) only at the national level, about one-third (29.4%, n = 5) had national and international partners, and 17.6% (n = 3) had only international partner(s).

Undergraduate degree programs
A total of 131 undergraduate degree programs were reported by 100 LIS schools in 49 countries. The admission requirements for these undergraduate degree programs included an entrance examination (54.2%, n = 45), a prior degree (44.3%, n = 35), and a minimum grade from a prior degree (47.3%, n = 35). Descriptive statistics for these undergraduate degree programs are presented in Table 3.

Most of these programs (58.3%, n = 60) had a library and information science/studies focus. Other focal areas included information management or science (11.7%, n = 12), information technologies (9.7%, n = 10), and archival management/science/studies (5.8%, n = 6). The face-to-face modality was the most used method of delivery (78.4%, n = 80), followed by hybrid instruction (17.6%, n = 18) and distance/online instruction (3.9%, n = 4).
At the time of data collection, a total of 16,005 students were enrolled in undergraduate degree programs. English was the most commonly used language of instruction (39.72%, n = 56), followed by Polish (6.38%, n = 9), Portuguese (6.38%, n = 9), and Spanish (6.38%, n = 9). The remaining languages are listed in Appendix 2. About 39% (n = 47) of the programs responded to a question about curriculum updates and a little over half of these programs (n = 26) indicated that their curriculum was updated in 2018 or later. Almost all the undergraduate programs had a graduation requirement (92.9%, n = 92) and 55% (n = 55) of the programs graduated their students within three years or more.

Half of these undergraduate programs (50%, n = 49) had an external accreditation and about 60% (n = 32) were accredited only by national organizations. The rest of the programs were accredited either only by international organizations or by national and international organizations.

Almost half of the undergraduate programs (43.8%, n = 42) had external partners outside their institutions. A little over half of the programs that had external partners (54.8%, n = 23) partnered with national and international partners, whereas 40.5% (n = 17) of the programs partnered only with national organizations.

### Specialist/professional degree programs

A total of 97 specialist or professional degree programs were reported by 57 LIS schools in 28 countries. Often, the admission requirements included a prior degree (82.5%, n = 52), a minimum grade from a prior degree (71%, n = 44), an interview (43.6%, n = 24), and a statement of purpose (43.4%, n = 23). Descriptive statistics for these programs are presented in Table 4. Almost half of the respondents (48.7%, n = 37) indicated that the primary focus of their programs was library and information science, followed by information management or science (15.8%, n = 12). More than half of the programs (54%, n = 41) used the face-to-face method to deliver instruction.

At the time of data collection, a total of 5227 part-time and full-time students were enrolled in these programs. English (43.14%, n = 44) was the most commonly used language for instruction, followed by French (7.84%, n = 8) and Spanish (7.84%, n = 8). The remaining languages are listed in Appendix 2. A little less than half of the programs (n = 31) responded to a question about the last time their curriculum was updated. The majority of these programs (58.1%, n = 18) indicated that their curriculum was updated in 2018 or later.

A little over 60% (n = 45) of the programs had external accreditation and 83.7% (n = 36) of the accredited programs were accredited by a national organization. The rest were accredited by an international organization (7%, n = 3) or by national and international organizations (9.3%, n = 4). More than half of the programs (52%, n = 39) had external partner(s) outside of their organizations. Although about half of these programs (53.8%, n = 21) had partners only at the national level, 41% (n = 16) had national and international partners.

### Master’s degree programs

A total of 198 Master’s degree programs were reported by 127 LIS schools in 53 countries. A prior
degree (93.2%, n = 123) and a minimum grade from a prior degree (72.5%, n = 79) were among the most frequently required criteria to be admitted to the programs. Descriptive statistics for the Master’s degree programs are presented in Table 5. A little over half of the programs (55.7%, n = 78) primarily focused on library and information science/studies and 11.4% (n = 16) of the programs had a primary focus on information management and science.

Most of the Master’s degree programs used the face-to-face format (62.9%, n = 88) for course delivery. At the time of data collection, 12,307 students were enrolled in these programs. About half of the programs (51.27%, n = 101) used English as the language of instruction, followed by Portuguese (5.08%, n = 10), Polish (4.06%, n = 8), and Urdu (4.06%, n = 8). The remaining languages are listed in Appendix 2. Almost all of the programs (93.6%, n = 131) had a graduation requirement (e.g. final paper, thesis, dissertation, examination, portfolio, practicum) and the majority of the programs (63.8%, n = 79) graduated their students within two years. About one-third of the programs (n = 65) responded to a question about the last time their curriculum was updated. The majority (69.2%, n = 45) indicated that their curriculum was updated in 2018 or later.

Table 4. Descriptive statistics for specialist/professional degree programs.

<table>
<thead>
<tr>
<th>Admission requirementsa</th>
<th>n</th>
<th>%</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior degree</td>
<td>52</td>
<td>82.5</td>
<td></td>
</tr>
<tr>
<td>Minimum grade</td>
<td>44</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>Interview</td>
<td>24</td>
<td>43.6</td>
<td></td>
</tr>
<tr>
<td>Statement of purpose</td>
<td>23</td>
<td>43.4</td>
<td></td>
</tr>
<tr>
<td>Program focus</td>
<td>76</td>
<td>48.7</td>
<td></td>
</tr>
<tr>
<td>Library and information science/studies</td>
<td></td>
<td>15.8</td>
<td></td>
</tr>
<tr>
<td>Information management or science</td>
<td></td>
<td>7.9</td>
<td></td>
</tr>
<tr>
<td>Library science</td>
<td>6.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archival management/science/studies</td>
<td></td>
<td>3.9</td>
<td></td>
</tr>
<tr>
<td>Information technologies</td>
<td></td>
<td>3.9</td>
<td></td>
</tr>
<tr>
<td>Data science or management</td>
<td></td>
<td>13.2</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>76</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>Face-to-face</td>
<td>35.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hybrid (face-to-face and distance/online)</td>
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<td>10.5</td>
<td></td>
</tr>
<tr>
<td>Distance/online</td>
<td>138</td>
<td>8.7</td>
<td></td>
</tr>
<tr>
<td>≤ 12 months</td>
<td>21.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13–24 months</td>
<td>31.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25–36 months</td>
<td>21.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36 months +</td>
<td>26.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geographical distribution</td>
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<td>32</td>
<td></td>
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<tr>
<td>Europe</td>
<td>16.5</td>
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<td></td>
</tr>
<tr>
<td>Africa</td>
<td>11.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oceania</td>
<td>10.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North America</td>
<td>8.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South America</td>
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</tr>
<tr>
<td>External accreditation</td>
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<td>62.7</td>
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<td>External partners</td>
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<td>Student population</td>
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<tr>
<td>Graduation requirement</td>
<td>76</td>
<td>92.1</td>
<td></td>
</tr>
</tbody>
</table>

aSum of the results may exceed 100% as respondents were allowed to choose multiple answers.

Table 5. Descriptive statistics for Master’s degree programs.

<table>
<thead>
<tr>
<th>Admission requirementsa</th>
<th>n</th>
<th>%</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior degree</td>
<td>132</td>
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</tr>
<tr>
<td>Minimum grade</td>
<td>109</td>
<td>72.5</td>
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</tr>
<tr>
<td>Statement of purpose</td>
<td>107</td>
<td>75.1</td>
<td></td>
</tr>
<tr>
<td>Interview</td>
<td>115</td>
<td>41.7</td>
<td></td>
</tr>
<tr>
<td>Program focus</td>
<td>140</td>
<td>55.7</td>
<td></td>
</tr>
<tr>
<td>Library and information science/studies</td>
<td></td>
<td>11.4</td>
<td></td>
</tr>
<tr>
<td>Information management or science</td>
<td></td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>Library science</td>
<td>2.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data science or management</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Archival management/science/studies</td>
<td></td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>Information technologies</td>
<td></td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>140</td>
<td>22.1</td>
<td></td>
</tr>
<tr>
<td>Face-to-face</td>
<td>23.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hybrid (face-to-face and distance/online)</td>
<td></td>
<td>13.6</td>
<td></td>
</tr>
<tr>
<td>Distance/online</td>
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<td>8.7</td>
<td></td>
</tr>
<tr>
<td>≤ 12 months</td>
<td>8.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13–24 months</td>
<td>55.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25–36 months</td>
<td>27.5</td>
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</tr>
<tr>
<td>36 months +</td>
<td>8.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geographical distribution</td>
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</tr>
<tr>
<td>Europe</td>
<td>26.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asia</td>
<td>20.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North America</td>
<td>9.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Africa</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oceania</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South America</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External accreditation</td>
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<td>54.4</td>
<td></td>
</tr>
<tr>
<td>External partners</td>
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<td>32.8</td>
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</tr>
<tr>
<td>Student population</td>
<td>129</td>
<td>12,307</td>
<td></td>
</tr>
<tr>
<td>Graduation requirement</td>
<td>140</td>
<td>93.6</td>
<td></td>
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</tbody>
</table>

aSum of the results may exceed 100% as respondents were allowed to choose multiple answers.
Table 6. Descriptive statistics for post-Master’s certificate programs.

<table>
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<tr>
<th>Admission requirementsa</th>
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<th>%</th>
<th>Count</th>
</tr>
</thead>
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<tr>
<td>Prior degree</td>
<td>13</td>
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<td></td>
</tr>
<tr>
<td>Minimum grade</td>
<td>8</td>
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</tr>
<tr>
<td>Statement of purpose</td>
<td>8</td>
<td>37.5</td>
<td></td>
</tr>
<tr>
<td>Program focus</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Library and information science/studies</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archival management/science/studies</td>
<td>12.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data science or management</td>
<td>12.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program modality</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Face-to-face</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hybrid (face-to-face and distance/online)</td>
<td>12.5</td>
<td></td>
<td></td>
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<tr>
<td>Distance/online</td>
<td>12.5</td>
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<td></td>
</tr>
<tr>
<td>Time to completion</td>
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<td>≤ 12 months</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>13–24 months</td>
<td>75</td>
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</tr>
<tr>
<td>Geographical distribution</td>
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<td></td>
<td></td>
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<td>North America</td>
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<td>Graduation requirement</td>
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<td>37.5</td>
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</tbody>
</table>

*aSum of the results may exceed 100% as respondents were allowed to choose multiple answers.

About half of the programs (54.4%, n = 74) had external accreditation. A large majority (76.1%, n = 51) of these accredited programs were accredited by a national organization and only 9% (n = 6) of them were accredited by an international organization. The rest (14.9%, n = 10) were accredited by national and international organizations. About one-third of the programs (37.5%, n = 44) had external partner(s) outside of their organizations and 56.8% (n = 25) of these programs had partnered with national and international organizations. Whereas 31.8% (n = 14) of the programs had partnered only with national organizations, 11.4% (n = 5) had partnered with international organizations only.

Post-Master’s certificate programs

A total of 13 post-Master’s certificate programs were reported by 13 LIS schools in four countries. Descriptive statistics for the post-Master’s certificate programs are presented in Table 6. These programs generally required a prior degree and minimum grade from a prior degree as admission requirements. The primary focus of a large majority of these programs (75%, n = 6) was library and information science/studies. The face-to-face modality (75%, n = 6) was the most commonly used method to deliver instruction.

At the time of data collection, 143 students were enrolled in these programs. Four programs used German as the language of instruction, followed by English (n = 3) and French (n = 1). About one-third of the programs (37.5%, n = 3) had a graduation requirement (e.g., final paper, thesis, dissertation, examination, portfolio, practicum) and all of the programs (n = 8) graduated their students within two years. Only two programs responded to a question about the last time their curriculum was updated. One program updated their curriculum in 2016 and the other in 2019.

About one-third of the programs (37.5%, n = 3) had an external accreditation and all of these accredited programs were accredited by national organizations. About one-third of the programs (37.5%, n = 3) had external partner(s) outside of their organizations and all of these programs had partnered with national organizations.

Doctoral degree programs

A total of 75 doctoral degree programs were reported by 59 LIS schools in 30 countries. Descriptive statistics for the doctoral degree programs are presented in Table 7. The admission requirements to the doctoral degree programs included a range of criteria, from a prior degree and interview to proficiency in an international language. The primary foci in these doctoral programs included library and information science/studies (57.1%, n = 24) and library science (9.5%, n = 4).

At the time of data collection, 1293 students were enrolled in these programs. English (62.3%, n = 38) was the most commonly used language of instruction, followed by Chinese (9.8%, n = 6). The remaining languages are listed in Appendix 2. All of the respondents indicated that they had a graduation requirement (n = 41) and most of the programs (78.6%, n = 33) graduated their students in three years or more. A little less than one-third of the programs (n = 17) responded to a question about the last time their curriculum was updated. A large majority of the programs (76.5%, n = 13) updated their curriculum in 2018 or later, and others chose to update their curriculum on an ongoing basis.

A little less than half of the programs (42.9%, n = 18) had an external accreditation. Thirteen (76.5%) of the accredited programs were accredited only by national organizations and the rest (n = 4) were...
accredited by national and international organizations. About one-third of the programs (36.6\%, \( n = 15 \)) had external partner(s) outside of their organizations. A large majority of these programs (80\%, \( n = 12 \)) partnered with national and international organizations, whereas two programs had only international partners and one program had only national partners.

**Discussion**

LIS schools and their accreditations are crucial in preparing competent library and information professionals. The results of this study give an overview of professional qualification accreditations and certification from LIS schools by using a survey procedure. A total of 198 LIS schools from 69 countries were represented in the sample, complementing previous studies that focus on specific regions, such as Europe (e.g., Juznic and Badovinac, 2005), Asia (e.g., Park, 2004), or Africa (Saka et al., 2018).

Although the results were more limited in some countries than in previous studies (e.g., 50 LIS schools in China versus the 24 programs obtained in this study; Bird et al., 2015; Schniederjürgen, 2007), this study represents the first effort worldwide to map the different initiatives.

Eighty-two percent of the LIS schools indicated that a type of credential (e.g., certificate, undergraduate degree) is required to work as a professional librarian. Although a definition of the LIS field was included in the survey, the diversity of the results obtained (e.g., the different names of the programs collected) suggests there is no common definition shared worldwide. Similarly, 70.2\% of the schools indicated that an accredited national degree is the most required credential. This is in line with previous studies, which show that requirements are diverse (e.g., Australian Library and Information Association, 2018; Chartered Institute, n.d.; Chu and Raju, 2018) or there is a need to embrace requirements, as pointed out by Saka et al. (2018) in Nigeria. The most frequently offered degrees by the schools in the sample are Master’s (34\%) and undergraduate (22.35\%) degrees. This is in line with previous studies (Park, 2004; Ueda et al., 2005). Also, it is worth mentioning that specialist/professional degree programs (16.55\%) stand out in some countries—for example, South Africa with 12 (19\% of its output), China with 12 (4\%), and Australia with 9 (5\%)—and non-degree programs (12.29\%) stand out in the USA (10 programs or 11.6\%), Mauritius (5, 100\%), and Australia (4, 26\%). Based on the responses, certain types of programs are more common in some places (e.g. Albania and Mauritius with non-degree; Belgium, Chile, and Colombia with specialist; Honduras and Kuwait with Master’s). Similarly, at the continent level, some profiles emerged (e.g., post-Master’s certificate in the USA, undergraduate in Europe). The results also show that higher levels of education are scarce (e.g. doctorate or post-Master’s certificate). In terms of program features, a prior degree or minimum grade is needed in all the categories, even for non-degree programs (58\% need a prior degree and 50\% a minimum grade). Moreover, the results show that the program focus is predominantly on LIS studies, with other areas (archival management, information

**Table 7. Descriptive statistics for doctoral degree programs.**

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<th>( n)</th>
<th>%</th>
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<td>100</td>
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</table>

\(^a\)Sum of the results may exceed 100\% as respondents were allowed to choose multiple answers.
management or science) having limited focus. Considering that LIS is a diverse area, this indicates that the programs participating in the study adopted a compartmentalized approach.

External accreditation is needed in all types of programs (62.7% of specialist/professional degrees, 54.4% of Master’s, 37.5% of post-Master’s, 50% of undergraduate, 42.9% of doctorate, 37.5% of non-degrees). This emphasizes the role of accreditation institutions in the LIS field, which is in line with previous studies (Majid et al., 2002). Not surprisingly, undergraduate and Master’s degrees have the highest student populations (16,005 and 12,307, respectively), and there are much lower numbers at the highest levels (e.g. 1293 in doctorate and 143 in post-Master’s degree programs). This study also emphasizes the need for having open data on this topic, not only for students (e.g. choosing to study abroad) but also for boosting research and professional mobility.

Conclusion

The global LIS community is responsive to the many diverse communities that it serves. This is reflected by the vast range of differences found in LIS programs. Undergraduate, graduate, and professional programs all serve to meet the need for trained information professionals throughout our communities. However, there are a number of overarching themes that resonate among information seekers. By providing tools that help facilitate greater levels of standardization, LIS programs can better collaborate with other programs to meet the expectations of a global marketplace. In addition, this flow of information is designed to be multidirectional, where both developing and developed countries can collaborate and share their unique experiences and expertise to build stronger education systems for both.

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Tiago Emmanuel Nunes Braga  https://orcid.org/0000-0001-6332-7965

References

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Chris Cunningham completed his doctoral studies at the University of South Carolina. He received his Master’s in Library and Information Studies from the University of North Carolina at Greensboro, focusing on technology, and his Bachelor’s degree in Art in History from the University of North Carolina at Charlotte, with minors in Mathematics.
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Núria Bautista Puig holds a Bachelor in Geography (University of Lleida, Spain), Master’s in Geographic Information Systems (GIS) and Remote Sensing (University of Zaragoza), and PhD in Library and Information Science (2020, Universidad Carlos III de Madrid), for which she won the Association for the Advancement of Sustainability in Higher Education’s (AASHE) Sustainability Research Award and Spanish thesis award. Currently, she is an assistant professor in the Department of Library and Information Science at the Complutense University of Madrid. Her areas of expertise include the fields of information science, organizational sustainability, and bibliometrics/scientometrics.

Tiago Emmanuel Nunes Braga received his PhD in Information Science from the University of Brasília, Master’s in Technological Education from the Federal Center of Technological Education of Minas Gerais, and Bachelor’s in Information Systems from the Pontifical Catholic University of Minas Gerais. Currently, he is the director of the Brazilian Institute of Information in Science and Technology, the leader of INSUMO: Information and Society Laboratory, an executive editor of LALCA: Latin American Journal on Life Cycle Assessment, and a professor in the Postgraduate Program in Information Science.

### Appendix 1 Distribution of degree programs by country

<table>
<thead>
<tr>
<th>Non-degree</th>
<th>Undergraduate</th>
<th>Specialist or professional</th>
<th>Master’s</th>
<th>Post-Master’s</th>
<th>Doctorate</th>
<th>Total</th>
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(continued)
### Appendix 1 (continued)

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### Appendix 2 Language of instruction by degree type

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Impact of multimedia on academic information literacy instruction in libraries

Hozefa Ramgadwala
Aljamea-tus-Saifiyah, Nairobi

Abstract
This study investigates the impact of multimedia within academic information literacy in the higher education sector. It considers the recent information and communications technology boom, its effect on academic information literacy preferences, and how it has affected pedagogy. Finally, it discusses the current and future trends of the influence of multimedia on pedagogical instruction. A survey of higher education students in three countries – the UK, Kenya and India – was undertaken to understand the shift towards multimedia in libraries. The aim was to determine if behavioural attributes (academic or artistic, verbalisers or visualisers) and the university’s location impacted multimedia learning. The results of the study do not support the aptitude–treatment interaction theory. In the current context, different learners (academic or artistic) need different kinds of instruction to optimise their learning. However, the survey found that students’ nature did not influence their choice of method of instruction (verbal or video). It also revealed that the university’s location facilitated or hampered students’ learning capabilities.

Keywords
Multimedia learning, information behaviour, higher education, information literacy, instruction method

Introduction
A library is at the heart of any institution’ is an old and frequently noted quote in the library sector (Gyure, 2008; Leupp, 1924; Portwood, 1936). So, it is likely that the lifeblood that flows through a library will eventually strengthen the entire institution. Academic libraries have played an integral role in connecting institutions’ learners with global trends, especially in the wake of the information and communications technology (ICT) explosion following the COVID-19 pandemic.

Multimedia learning has become an increasingly popular learning method throughout the education sector. The basic principle of multimedia learning is that people learn better ‘from words and pictures than from words alone’ (Mayer, 2014: 3). ‘Academic information literacy’ in this article refers to the information literacy that equips students with the skills and knowledge for the effective identification of information, and is required to find, evaluate, organise and effectively use information to address problems or issues (Owusu-Ansah, 2003).

An information-literate person is ‘someone who knows the techniques and skills for using information tools in moulding solutions to problems’ (Crawford and Irving, 2013: 21). Multimedia instructional teaching designed according to the workings of the human mind is more likely to lead towards meaningful learning than that which is not (Mayer, 2014). So, designing the teaching curricula for academic information literacy with the use of multimedia will lead towards effective and meaningful learning for students.

This research aims to explore the shift from textual to multimedia formats in academic information literacy. It considers the innate human behaviour of visual appeal and discusses behavioural influences in preferring multimedia content over simple text. In order to assess the influence of multimedia through the ICT boom in recent years, its impact
on academic information literacy preferences and how this phenomenon has affected pedagogical practices, a survey of higher education students in three countries – the UK, Kenya and India – was designed. These three countries were selected for the survey because the data gathered would cater for a diverse range of participants and an overview of the multimedia preferences of higher education students in three continents could be formed, thereby indicating the general preferences of the higher education sector. The findings from the survey will help to draw comparisons between these three countries, which will help in identifying the key factors and constraints in shaping students’ multimedia preferences in learning about the library resources in these regions. They also help highlight the differences between the Global North and the Global South, and the influence of the economic differences in these regions on students’ learning.

This study also supports one of the United Nations’ Sustainable Development Goals to provide quality education and reduce inequalities in the higher education sector in these regions. The study attempts to identify the symptoms and causes of inequalities for students and what hampers their ability to reach their full potential in benefiting from the growing number of ICTs. The cross-continental nature of this study makes this research unique compared to other case studies and surveys (some of which are discussed in the literature review), which have been mainly conducted within a particular region. One of the reasons why these three countries were selected for the survey was that the author has worked as an information professional in the higher education sector in these countries, which helped in successfully conducting the survey in the three regions. The author’s background in the higher education sector prompted the investigation of the influence of the economic differences in these regions on students’ learning.

The purpose of the survey was to evaluate the effectiveness of multimedia in teaching academic information literacy, and it sought to answer the following research questions:

1. Does students’ behaviour affect their multimedia learning of information literacy in higher education?
2. Does the location of the educational institute impact students’ multimedia preferences and constraints?
3. What constraints affect students’ ability to benefit from multimedia?

**Background and purpose of the study**

To understand higher education students’ shift towards the multimedia format, two objectives were identified: to investigate (1) students’ internal preferences – that is, their innate behaviour or academic nature, which was central to the study to test the aptitude–treatment interaction theory – and (2) external influences – that is, the recent ICT boom. However, because such technological advancement (infrastructure, equipment, connectivity, media applications) is not found across the globe, the students’ country of study was considered, in order to understand if the geographic location was linked to constraints affecting their multimedia learning. Similarly, this helped to identify the current pedagogical trends in information literacy among higher education students (methods of instruction, length of instruction, supporting infrastructure), which will help predict the influence of multimedia on pedagogical instruction for information literacy in the future.

**Literature review**

This review discusses the literature on multimedia’s influence on academic information literacy and its impact on pedagogical instruction.

**Multimedia learning**

Itally, using different media such as text, audio, video, among others’ (Abdulrahaman et al. 2020:1), for instance, state: ‘Multimedia technology is an important aspect of ICT that deals with how information can be represented and presented digitally, using different media such as text, audio, video, among others’. Silk et al. (2015) observe that more online students were successful in finding resources than those in an in-person instructional environment because the online students watched a video on finding empirical research and then instantly applied the skills to their library databases.

Research also suggests that visually appealing presentation results in higher information retention and many individuals learn better through broader media support (Anderson and May, 2010; Azadbakht,
2021; Murphy and Liew, 2016; Ware, 2011) as people can have different preferred sensory channels for learning and multimedia allows for diverse representations. Although the aptitude–treatment interaction hypothesis of verbalisers and visualisers has been extensively researched, the literature suggests that multimedia learning is effective for all kinds of learners and has benefits with respect to content retention and positive emotions (Chen and Sun, 2012; Massa and Mayer, 2006; Ocepek et al., 2013).

**Librarians as teachers**

The literature shows that the role of the academic librarian has changed significantly in the last few decades (Hamada and Stavridi, 2014). The most frequently mentioned changes are academic librarians’ increased teaching role – teaching information literacy and library skills – and increased liaison with faculty. Therefore, librarians need to know more about teaching theory and techniques to provide high-quality information literacy teaching (Simmons and Corrall, 2011; Wheeler and McKinney, 2015).

However, a central problem in multimedia-based education is that, as Wheeler and McKinney (2015) explain in their article ‘Are librarians teachers?’, librarians have not received adequate training to teach students, and employers require teaching skills from new graduates and expect that they have learned these skills during a postgraduate course. They further discuss that, in 2010, in an investigation of postgraduate librarianship education in the UK at the University of Sheffield, it was found that only three UK library courses offered teaching-related modules. Similarly, one survey found that 15 out of 78 surveyed librarians had gained their formal teaching training and qualifications through other sources, and only one reported having gained their teaching skills through a librarianship diploma (Wheeler and McKinney, 2015). This attitude has changed in recent years as library organisations are making an effort to meet this requirement and provide continuing professional development for librarians to develop new skills and knowledge (Elbert et al., 2012), especially ICT and teaching skills (Suthiprapa and Tuamsuk, 2022).

**Methods of instruction**

There is also a debate around methods of instruction and modes of delivery. Many case studies and research on pedagogy and library teaching systems aim to find the best medium to engage and educate students. A few examples and case studies will be discussed here.

Scales et al. (2014) discuss their experience of redesigning two of the most central online tutorials at the Washington State University Library by incorporating multimedia, which eventually challenged them to adopt newer pedagogical models in the information literacy curriculum. Similarly, Gorman and Staley’s (2018) study supports the possibility that online instruction may be more effective than in-person instruction for improving performance and is preferred by on-campus students for learning information literacy skills. Milic et al.’s (2016) research concludes that implementing blended learning approaches could be considered an efficient alternative to traditional classroom teaching for medical students.

In a blended course, students complete activities online, watch videos and then attend a workshop. This approach has been widely observed following the COVID-19 pandemic, and many universities in the UK have adopted this method. For example, in the author’s own experience at University College London during the 2021–2022 academic year, the blended learning approach and students’ engagement in library and information studies modules were highly positive. The author observed that when students could understand and revisit pre-class tutor-led lectures, they participated and engaged more in the class workshops.

According to Gorman and Staley (2018), most students who had experienced both instructional formats – face-to-face and online – preferred the online method. The main reason these students gave for this preference was that they were able to engage with and complete the material at their own pace and convenience, and this led to greater comprehension and assimilation of the skills being taught (see also Johnston, 2010; Zhang et al., 2015).

Overall, the majority of findings, in one way or another, reflect the benefits of blended learning and multimedia usage in education. However, due to the COVID-19 pandemic, there was a change in educators’ perspectives of online teaching. Kelly’s (2021) study shows that due to virtual or hybrid teaching, educators were working longer hours yet instruction was suffering. Hands-on and group work was largely limited or eliminated entirely, and many lessons had to be heavily adapted. Most concerning was the outward deficit in educators’ morale due to their incapability to adapt swiftly.

The shift during the pandemic upended the routines of students, faculty and staff alike. Kelly and Columbus (2020) have speculated about the future of American higher education following the pandemic in light of the fundamental challenge it posed for
institutions that were originally designed to bring large groups of people together for teaching, learning, research and socialising. The pivot to remote instruction across higher education was a remarkable accomplishment, but the makeshift models in most places bore little resemblance to state-of-the-art online delivery. Research suggests that socio-economically disadvantaged and less academically prepared students are more likely to struggle in online courses, and that the achievement gaps between low-income students and their more affluent peers are larger in exclusively online courses (Kelly and Columbus, 2020).

**Influence of university location on multimedia learning**

A common challenge for the online instruction method is an inadequate infrastructure, especially in regions with low Internet penetration or bandwidth where multimedia tools cannot be easily accessed (Ndemo and Weiss, 2017). The reason for this could be either the location of the teaching (e.g. in a developing nation or underdeveloped region) or the cost of obtaining high-speed Internet facilities. Bramann discusses the critical barriers for early ICT ecosystems in resource-scarce countries, such as Kenya, and identifies that rural areas in such countries lack structure and have connectivity issues that may affect students’ learning (Ndemo and Weiss, 2017). Similarly, Pavel et al. (2015) discuss the effect of the social and economic development of a country on its ICT growth, especially in the higher education sector, and assert that they are co-dependent and influence each other. The more advanced the socio-economic position of a country, the more active the role of technology in society and the greater the emphasis on the need to familiarise students with ICT. For instance, since early 2000, the UK government has been developing new ways of teaching and learning using ICT and created awareness to achieve pedagogical change (Yang, 2012).

On the contrary, research in India manifests that even though the country has seen great progress in the educational technology (Edtech), due to its vast population and differences between urban and rural regions, there is uneven growth of ICT in the country, and to the government needs a systemic approach to successfully implement and integrate ICT in schools and colleges (Dangwal, 2017). Similarly, in Kenya, research suggests that the ICT infrastructure needs a lot of development, and the government should put in place policies that allow its strategic development without copying generic policy prescriptions that have worked in the West (Ndemo and Weiss, 2017).

**Methodology**

For the quantitative research, 300 undergraduate and graduate students studying arts and humanities and social sciences subjects from universities in three countries – the UK, India and Kenya – were selected. The aim was to survey 100 students from each country to obtain varied responses in an attempt to represent the student body to represent the student body by surveying a considerable number of students from each region and 100 respondents is an effective sample size (Delice, 2010). Students from various universities in each country were invited to participate in the survey to ensure a wide range of responses, including academic and arts students in each region. In the UK, students from the Department of Information Studies at University College London and arts students at the University of the Arts London – in the colleges of Central Saint Martins, Camberwell, Chelsea and Wimbledon – were invited to participate in the survey during September 2022. In Kenya, students at Aljamea-tus-Saifiyah (Nairobi campus), the Catholic University of Eastern Africa and Tangaza University College were invited to participate, and, in India, students from the Aljamea-tus-Saifiyah campuses at Surat and Mumbai. The survey was conducted by the library staff at the selected universities. Students from across the universities were invited to complete the survey. The survey link was sent to the students through the library or librarians’ email or other library media platforms. This provided responses from different categories of students (regular and non-regular library users, academic and artistic students), which were then compared and contrasted across the geographical regions.

In line with University College London’s data protection policy, this project was registered with the Data Protection Office at University College London on 22 August 2022. The survey was conducted using the Opinio software – access was provided by University College London. The findings – frequency tables, ratios, percentages and figures (charts) – were autogenerated through its web-based version. The research data is stored in a public data repository under the title ‘Multimedia effects on AIL’ (Ramgadwala, 2023). Also a chi-square test was conducted to compare the main practices and findings across the three countries.

Bloom’s taxonomy partially informed the survey questions (Anderson and Krathwohl, 2001). The questions were devised in such a way that some of the lower-order thinking skills (remember, understand, apply) and some of the higher-order thinking skills (analyse, evaluate, create) of Bloom’s taxonomy were
assessed. The survey was also flexible in integrating this taxonomy as it was essential to consider that the students were situated in different regions of the world and there were contextual variables associated with each region (see Dorner and Gorman, 2006). It was also considered that a student does not need to pass through all these stages, which may differ at an individual level (see Wright, 2012). Wright (2012) proposes that the pyramid structure implies a ‘scarcity of creativity’, and only those who can transverse the lower levels can reach the summit and be creative. For example, a question was asked regarding the students’ preference for learning about a database, where a library instructor and a short video were provided as options. This question was asked to gather insights about students understanding, how they best learn about a library database. The above question assessed students’ higher-level skills of catered for the higher-level skills of ‘analyse’ and ‘evaluate’ in Bloom’s taxonomy (Anderson and Krathwohl, 2001).

The survey comprised four parts: demographic information (age, region); nature of the student (academic or artistic); preference for library instruction (in person, online, blended); and significant constraints affecting multimedia learning.

A survey, according to Balnaves and Caputi (2001), is a method of collecting data from people about who they are (education, finances), how they think (motivations, beliefs) and what they do (behaviour). Surveys usually take the form of a questionnaire, which a person fills out alone or by interview schedule in person or over the telephone, and result in a variable-by-case data matrix (Balnaves and Caputi, 2001). A descriptive statistical analysis approach was taken to analyse the data, which is appropriate for reporting patterns in these kinds of surveys because it can identify development patterns and differences and help summarise them constructively, so meaningful patterns might emerge that produce significant results. The above-mentioned approach is suitable for conducting descriptive statistical data analysis in quantitative research (Balnaves and Caputi, 2001; Chen and Cheng, 2022; Sandelowski, 2010). The survey findings point to the effect of multimedia on students’ information literacy learning and may help in creating reformed pedagogical practices in academic libraries that incorporate multimedia as an integral part of the information literacy curriculum.

The survey also explored the connection of multimedia learning to other variables – for example, does the geographic location affect the preference for multimedia learning among students or does a student’s age influence their choices? Therefore, the first section was regarding the students’ demographics and behaviour preferences because discovering correlations between factors and behaviours would lead to the ability to predict the areas affecting students’ learning, given the specific user attributes and backgrounds. For example, it was helpful to know if students with an artistic nature were more likely to learn through a video tutorial or a library instructor. This considers the innate behaviour of students in their preferences and the impact of ICT and influence of multimedia on their choices.

Findings

General overview

The survey received 306 responses, of which 81 were not allowed to proceed to the second stage or did not complete and submit their response. In total, 225 participants completed the survey, including the second section, but did not answer all the questions from Section 2, and 190 participants answered all of the questions in both sections. The survey comprised 10 questions – four on the students’ demographics (Section 1) and six on their learning experience with multimedia tools at a university library (Section 2). The aim was to understand their preferences and choices when learning about their library’s resources.

The first question asked if the participant was a current university student or a recent graduate; 249 responded positively, 16 answered ‘no’ and 41 did not answer the question. The next question in the first section was regarding the participants’ age. Of the total number of respondents, 256 were aged between 19 and 29, six were between the ages of 30 and 40, two were between the ages of 41 and 50, one preferred not to disclose their age and the remaining did not answer this question (Figure 1).

With regard to the students’ geographical location, 43 participants were from the UK, 55 from Kenya and 143 from India (this includes the responses from the participants who were not students or recent graduates). Twenty-three of the participants answered that they were not from the three mentioned countries and 42 did not answer or left this question blank, giving a total of 306 respondents (Figure 1).

The survey sought responses only from current university students or recent graduates from the countries mentioned above. Therefore, if the participant selected that they were not a current university student or recent graduate, or not from the countries mentioned above, they were no longer required to proceed with the survey. So, out of the 243 respondents from the three countries, only 225 were allowed to proceed to the next stage. Of these 225
respondents, 190 answered all of the questions, which was the final sample for the study in the second stage.

The final question inquired about the students’ academic nature. Were they academic and preferred reading books? Or were they more interested in the visual depiction of data and artistic? Or did they identify as both? The majority of the students (41, 43%) identified themselves as both academic and artistic, whereas 31% (83) and 24% (64) identified themselves as academic and artistic, respectively (Figure 2).

The second section of the survey comprised six questions relating to the students’ learning choices in libraries and the constraints they faced in using multimedia. These questions can be divided into three categories in accordance with the three research questions discussed in the methodology section above.

**Interval variable questions.** Four questions were asked in this category. These were the questions where the distances between the intervals were supposed to be clearly known by the participants (Balnaves and Caputi, 2001). The interval variable questions were of two kinds: the first inquired into how strongly the students agreed or disagreed with a statement and the second asked about the length of instruction – how long the students would prefer a specific type of instruction (live instruction versus online on-demand videos) to be. The intervals between the choices in both questions were distinctly mentioned.

For the first kind of interval variable question, two questions were asked (Figure 3). Overall, for both questions, more than 90% of the students believed (strongly agreed or agreed) that multimedia was a helpful learning tool and helped them retain and remember more information in the long term.

With regard to the length of instruction, the two questions asked about how long the students would prefer to spend on a particular type of instruction that taught them about authoritative resources using multimedia tools. There were four choices for both questions: 15–20 minutes, 30–40 minutes, 1 hour and more than 1 hour. The first question asked how long they would prefer a live instruction class on finding authoritative resources to last, where the majority of the students (113, 59%) chose 15–20 minutes, 63 students (33%) chose 30–40 minutes, 13 students (7%) chose 1 hour, and one student chose more than 1 hour (Figure 4). The second question inquired how long the students would prefer to spend watching a video explaining authoritative resources. The responses were similar to those to the first question, but here 81% of the students (154) chose 15–20 minutes, compared to 59% for the first question, and only 14% (27) preferred watching a 30–40 minute video, compared to 33% for the first question (Figure 4).

**Method of instruction.** Following Anderson and May (2010), this category inquired about the students’ learning preferences and how they would choose to learn about a database: via face-to-face, online, blended or no instruction. Question 8 asked the students about their preferences for learning about a database such as JSTOR, ProQuest or the Web of Science. The majority of the students (74, 39%)
preferred to learn about a database through a short self-explanatory video, 28% (54) preferred a live explanation by a library instructor, and 24% (46) preferred to view a video in the presence of a library instructor, whereas 8% (16) preferred to learn about a database without any instruction (Figure 5).

Limitations. The last question inquired about the constraints that the students considered were affecting their use of multimedia in their learning. In this question, the students were allowed to choose multiple options (Figure 6).

The majority of the students (88, 46%) believed that ‘lack of training for students’ was the primary constraint that hampered their ability to maximise the use of multimedia for their learning. Thirty-eight percent (73) believed that connectivity issues had an impact on their learning. Only 23% (45) identified staff training as an issue, whereas 16% believed that they had no significant issues affecting their learning and 13% (25) said that their concern was not listed in the options (Figure 6).

The chi-square statistic is 11.2057 and the \( p \)-value is .24347, so the result is significant at \( p < .05 \).
The $p$-value from the chi-square test is less than .05, indicating that the result is statistically significant and the data provides sufficient evidence to warrant the rejection of a null hypothesis (Table 1). A chi-square test of independence was performed to assess the relationship between the university’s country and the mode or length of instruction the students received. The relationship between these variables is significant, $X^2 (1, N = 190) = 11.2, p = .243$. This indicates that there is a significant relationship between the two variables – the country of the university and the choices of the university students in terms of preferred mode or length of instruction.

**Comparative overview**

This section discusses the results from the data collected through the following steps: (1) a comparison
between the responses from students who identified themselves as artistic, academic or both and (2) a comparison between the student responses from the UK, Kenya and India.

**Comparison between responses from students who identified themselves as artistic, academic or both.** The reason the question ‘How do you identify yourself academically?’ was asked in the first section of the survey was to understand if the nature of the student (academically) affected their multimedia choices for learning about library resources. Overall, it was found that the nature of the student (as identified by the students themselves) did not have a major impact on their choices. Only in two instances was there a significant difference in the responses according to the nature of the students. Students who identified as ‘both’ (academic and artistic) chose live instruction as their preferred method of instruction, whereas the popular choice for other students was video tutorials. Similarly, with regard to the constraints that affected multimedia use for student learning, most of the students chose ‘connectivity issues’, whereas the popular choice for academic and artistic students was ‘lack of training for students’ (see Figure 7).

In response to the interval variable questions, the majority of the students, despite their nature:

- Agreed that multimedia helped them learn about library resources;
- Agreed that multimedia helped them retain and remember more information in the long term;
- Chose the 15–20-minutes option for the preferred length of a live instruction class to find authoritative resources;
- Chose the 15–20-minutes option for the preferred length of a video explaining how to find authoritative resources.

This is similar to the findings in the previous section.

With regard to the preferred method of instruction, the students were asked how they would prefer to learn about an online database. The ‘short self-explanatory video’ option was a popular choice among the academic (44%) and artistic (48%) students, and the second option for students who
identified themselves as ‘both’ (31%). The majority of the students who identified themselves as ‘both’ (academic and artistic) preferred a live instruction class (38%) over all the other options, which was not a popular choice for both the academic (21%) and artistic (18%) students. Similarly, viewing a short video in the presence of an instructor was the second choice among the academic (27%) and artistic (33%) students, but not popular among students who identified themselves as ‘both’ (19%) (Figure 7).

Considering the major constraints or problems faced during the use of multimedia, overall, the ‘lack of training for students’ was chosen by a significant number of the students. It was the top choice for academic (49%) and artistic (54%) students, and second for students who identified as ‘both’ (41%). Another similarity in the responses to this question was that more than a third of the students, irrespective of their nature, chose ‘lack of proper equipment or infrastructure’ as a constraint hampering their ability to maximise the use of multimedia: academic (37%), artistic (37%) and both (35%) (Figure 8).

Comparison between student responses from the UK, Kenya and India. In the UK, the majority of the students (54.5%) identified themselves as ‘academic’ and interested in reading and textual media, whereas in Kenya and India, most students (44.6% and 47.5%,

Figure 7. Preferred method of instruction according to nature of students.

Figure 8. Major constraints affecting the use of multimedia according to nature of students.
respectively) identified as ‘both’ academic and artistic, and interested in both textual and visual media. In both Kenya and India, there were more students who identified as academic (28.5% and 26%, respectively) than artistic (25% and 24%, respectively) (Figure 9).

The interval variable questions were of two types: the first inquired into how strongly the students agreed or disagreed with a statement and the second asked about the length of instruction – how long the students would prefer a particular type of instruction to be. There were two questions asked in the first type. The first asked how strongly the students agreed or disagreed that multimedia is a helpful learning tool for learning about library resources. The second asked how strongly the students agreed or disagreed that multimedia helped them to retain and remember more information. In all three countries, the students’ responses were similar for both questions, with slight differences in Kenya. Almost 97% of the students in the UK and India and 100% in Kenya either agreed or strongly agreed that multimedia helped them learn about library resources.

However, most students in all three countries were inclined towards agreeing rather than strongly agreeing that multimedia helped them remember more information in the long term: in the UK, 78% agreed and 16% strongly agreed; in Kenya, 56% agreed and 38% strongly agreed; and in India, 67% agreed and 25% strongly agreed (Figure 10).

The students were asked about their preferred method of instruction. For example, Question 8 asked how they would prefer to learn about a database such as JSTOR or ProQuest. The choices they were given were as follows: live explanation by a library instructor, a short self-explanatory video, a short video in the presence of a library instructor or no instruction. Although the ‘short self-explanatory video’ option was a popular choice overall, when comparing the results across the countries, it was found that this choice was popular in the UK (57%) and Kenya (42%), whereas in India the majority of the students (34%) preferred to learn about a database through a live explanation by a library instructor.

Another significant finding was that, in the UK, there was a considerable difference in the preferences. A large majority of the students preferred the ‘self-explanatory video’ option (57%), which was more than the three other options combined – live explanation (16%), video in the presence of an instructor (19%) and no instruction (8%). In Kenya, although the ‘self-explanatory video’ option was the students’ top choice (42%), there were only notable differences between this option and the other two library-instructor options – live explanation (27%) and video in the presence of an instructor (27%). However, in India, although the majority of the students (34%) chose the ‘live explanation by a library instructor’ option, there were no significant differences between this choice and the other two options: a self-explanatory video was the next most popular option (31%), followed by viewing a short video in the presence of a library instructor (25%). The percentage of students who preferred the ‘view a video in the
presence of an instructor’ option was very similar when comparing the results from Kenya (27%) and India (25%) (Figure 11).

Lastly, the students were asked about the constraints they believed affected their use of multimedia. Overall, the students identified ‘lack of training for students’ as a significant issue that hampered their ability to maximise the use of multimedia for their learning, as in all three countries, 40%–50% of the students chose this option. The majority of the students in the UK and India (41% and 49%, respectively) chose the ‘lack of training for students’ option as the main problem affecting their learning (in the UK, however, ‘lack of proper equipment/
infrastructure’ and ‘inadequate media applications’ had the same score, with 41% each). In Kenya, connectivity issues were found to be the main constraint (47%), followed by lack of training for students (44%). Although connectivity issues were a major constraint in Kenya, surprisingly, in the UK and India, it was also a popular choice, where 35% in both countries said that this was a substantial problem. Similarly, ‘lack of proper equipment/infrastructure’ was a popular choice in both the UK (41%) and India (39%). The least selected constraint in all three countries was ‘undertrained staff’. Less than a quarter of the students chose this option – the UK (24%), Kenya (24%) and India (23%) (Figure 12).

Discussion
This section discusses the meanings to be derived from the comparative data discussed in the previous section through observations of the survey findings in an attempt to answer the three research questions.

The students’ age, country and nature were the focal points for this survey to determine if these demographics directly influenced their multimedia learning choices. As 96% of the students were between the ages of 19 and 29, and only seven were in the other age brackets, this aspect will not be studied in detail. The reason why the country and nature of the students were considered is linked to the research aims – namely, to consider the effect of human behaviour and geographic region in the shift from textual formats to multimedia formats in learning academic information literacy for students in the higher education sector.

Comparison between the responses from students who identified themselves as artistic, academic or both
Academic and artistic individuals showed many similarities when choosing the method of instruction (self-explanatory videos), which strengthens the fact that irrespective of how students identify themselves, multimedia instruction is popular among all types of learners. This finding is supported by Massa and Mayer (2006), who conducted an experiment with college students to determine if visual learners (in this survey, artistic students) learned better from multimedia instruction that offered more pictures or illustrations and verbal learners (in this survey, academic students) learned better from printed text. They concluded that there was not strong support for the hypothesis that different kinds of multimedia instruction should be given to the different groups (the text group and the pictorial group). Their study also aligns with the findings for the three different groups in this survey because, first, all students, irrespective of their nature, agreed that multimedia was helpful in their learning. Second, most students (44%) from the academic group chose the video method of instruction, although, according to the aptitude–treatment interaction hypothesis discussed earlier, they identified as verbal learners and should have preferred live instruction. Similarly, students who identified as ‘both’ (academic and artistic or verbal and visual) chose the live instruction method. So, to conclude, the result from

![Figure 12. Major constraints affecting the use of multimedia by country.](image-url)
this survey and the supporting literature is that no one method can be recommended based on the academic nature or behaviour of a student, but a blend of both approaches (verbal and visual) should be implemented. For example, for teaching about an online database, the best way for an instructor could be to use the visual aids from a tutorial (screencast, animations) while providing students with the opportunity to individually practise and navigate through a database because this is the best way students will learn about databases (Gorman and Staley, 2018; Silk et al., 2015). As concluded by in-depth, multifaceted research, ‘no matter what students’ preferences of cognitive styles are (verbalizers/visualizers), designing learning materials as video-based multimedia material may be a better approach because video-based multimedia material can facilitate students’ positive emotion and learning performance (Chen and Sun, 2012; Ocepek et al., 2013).

Interestingly, a report was generated for all of the students who selected the live instruction method. It was found that the majority of the students who chose this option over the other choices that had a video tutorial option in the ‘method of instruction question’ selected ‘connectivity issues’ as their primary constraint (48%), which could imply that students chose the live instruction option because they had connectivity issues (Figure 13).

**Comparison between student responses from the UK, Kenya and India**

The results in Kenya and India were very similar concerning students’ nature. The majority identified as ‘both’ academic and artistic, which supports Islam and Ahmed’s (2012) assessment that the information needs of communities in developing countries are similar. The least number of students identified as artistic, which could support the theory that most students do not consider themselves to be artistic due to parent or teacher evaluations during their early years, and constantly compare themselves and are afraid to call themselves artists because of social validation (Langer, 2007). On the other hand, with reference to textual media or reading, the social norm is that students of all kinds are required to read and understand text because success in reading is believed to be crucial for students, both for their academic and psychological well-being (Carnine et al., 2009).

The findings clearly show that regardless of the region where the university was located, the majority of the students (97%) believed that multimedia was a useful learning tool and helped them retain more information. This supports the studies by Abdulrahaman et al. (2020), Guan et al. (2018), Mayer (2014) and Shah and Khan (2015), which found that multimedia helped in presenting information and complex processes in a rich way, and portrayed different levels of abstraction vividly, which helped with meaningful and authentic learning that students would retain over the long term.

It was also evident from the responses that a self-explanatory database video was a popular choice in the UK and Kenya, compared to listening to a live instructor, whereas in India, listening to a live lecture was the most popular choice and a self-explanatory video came second. This supports the literature and
findings that in today’s age students have a greater preference for listening to a recorded rather than live lecture (Bradbury, 2016). One reason for the live instruction option being popular in India compared to the other countries could be the culture of the country. As research has shown, India might still have a traditional approach to teaching. As discussed by S rangapani (2014), the idea of learning from a ‘guru’ may still be the most legitimate form of learning today within many Indian schools, and so a revised curriculum encompassing the widespread use of multimedia may still not be the norm for many students. So, as there is more focus on the instructor and lectures rather than student-centred learning, the majority of the students in India chose the live instruction class over the other options. Conversely, in the UK, where the government has actively enforced ICT developments in higher education, students preferred self-paced videos, as they may have already been acquainted with such a learning method in their classrooms (Pavel et al., 2015).

Overall, most of the students chose the ‘self-explanatory video’ option, which could be because in an online tutorial, students are presented with several visual aids (screencasts, animations, images and texts) that may assist them in finding research articles more easily compared to a live instruction class (Scales et al., 2014). Similarly, Brettle and Raynor (2013) and Gorman and Staley (2018) suggest that the availability of an online tutorial can reinforce new skills and aid students in practising using online databases. It was also observed that the 15–20-minutes option was popular for both instruction methods – live and video – but this choice was preferred for video instruction, where the 30–40 minutes option was also widely chosen, which supports the 15-minute attention span theory (Svinicki and McKeachie, 2011). This theory asserts that, during lectures, students experience a waning of attention after about 10 minutes (Wilson and Korn, 2007). A similar observation has been made with regard to informative videos such as TED talks, where a rule dictates that the presentation should last 18 minutes, based on the conception that 18 minutes is long enough to make a ‘serious’ presentation but short enough to hold a person’s attention (Bradbury, 2016). Also, a chi-square test was conducted to assess the relationship between the most selected options – short tutorials as the method of instruction and 15–20 minutes as the length of any kind of instruction. The results indicate that there is sufficient evidence to conclude that a relationship exists between the categories’ variables (Table 1).

However, these findings do not form a conclusive result that students prefer videos over live lectures because the very same students who chose a short video tutorial as their preferred method of instruction also opted for a 30–40-minute live instruction class. So, if the ‘Sun had set on the Day of lecture’, as Bradbury (2016:512) refers to in his statement, then, the majority of students would have selected for a shorter lecture period. Similarly, this choice – viewing a self-explanatory video – does not imply that students are well equipped to learn about library resources and conduct research with the help of multimedia on their own. If this were the case, most students would not have identified the option ‘lack of training for students’ as a limitation that hampered their ability to use multimedia for their learning. This barrier – a lack of effective training – was identified as one of the most significant constraints that affected the integration of ICT in teaching and learning by Bingimlas (2009), who extensively reviewed the barriers to successful ICT integration, and Ndenje-Sichalwe and Elia (2021), who studied the research methodology practices of information studies students in Tanzania. So, it could be concluded that the literature from diverse areas points to this significant constraint faced by students across the globe.

A further constraint is the lack of proper equipment or infrastructure – the UK (41%) and India (39%) – which supports the research by Gann (2019), who identifies ‘lack of access’ as a significant barrier to digital inclusion in the UK. This finding also supports the studies by Ndemo and Weiss (2017) and Siyao et al. (2017), who discuss the limitations of ICT in Kenya. They explain that although, through ICTs, it is possible today for open access material, lecture videos and presentations to be available, there are still constraints that need to be overcome. For example, in rural areas online courses are of little help without proper Internet connection. So, it is necessary for less developed countries to develop infrastructures, such as reliable electricity supplies and stable Internet connections, and move towards a more decentralised environment to benefit from the availability of digital tools (Ndemo and Weiss, 2017). This is recent research, so it can be concluded from the findings and literature that, in developing nations, an unstable Internet connection is still a major constraint, which could severely impact students’ learning. A university’s location, therefore, does have a significant impact on students’ multimedia learning.

According to the findings, the students believed that staff were well trained because less than a quarter identified ‘undertrained staff’ being an issue for their learning. This means that students still require assistance
and help with multimedia learning from an expert and trained library professionals, who are competent to train them and facilitate the appropriate infrastructure to provide them with access to learn from multimedia resources. Another notable aspect is that students may learn about navigating through a database successfully through online platforms or video tutorials (Brettle and Raynor, 2013; Gorman and Staley, 2018; Silk et al., 2015). However, when teaching students about a library’s physical resources or the current trends of technology in education, the library instructor may play an important role that cannot be replaced by a generic video tutorial. This is because the instructor’s expertise can help provide students with material tailored according to their research needs and level of understanding. This concept is discussed by Booth (2011) when she explains how to actively engage students by simply demonstrating an immersive activity – for instance, in the ‘visualisation’ category, when she wanted to engage a group of undergraduates in thinking of alternative search keywords and topical narrowing, she introduced the dynamic Visual Thesaurus website (www.visualthesaurus.com). She further elaborates that students frequently cited the Visual Thesaurus as valuable, saying: ‘I loved the Visual Thesaurus website’ (Booth, 2011: 77).

Similarly, the fourth option in inquiring about the method of instruction (i.e. would prefer to explore the database without instruction) was not popular in any of the three countries – the UK (8%), Kenya (4%) and India (10%) – which could imply that in all three countries, students prefer a method of instruction. So, according to the literature and the students’ responses, it could be inferred that librarians and library instruction are still a significant aspect of student learning.

**Recommendations**

One aim of this research was to discuss the future trends of the influence of multimedia on pedagogical instruction, especially in teaching information literacy in libraries. Therefore, the findings from this survey could help structure or restructure the information literacy instruction framework, enabling and equipping students with better multimedia solutions to help them in their research. The findings are as follows:

- In all three countries, a lack of training for students was mentioned as the first or second major constraint that affected their multimedia learning in university libraries (it was first in the UK and India and second in Kenya, followed by connectivity issues). So, incorporating student training as an integral part of the library’s instruction programme or curriculum could be helpful.
- The training and teaching of students could be live or virtual, synchronous or asynchronous, but preferably should last between 20 and 30 minutes, especially during online or virtual instructional videos, as the findings suggest that the students usually preferred sessions of 15–20 minutes’ duration.
- It would be useful to provide access to or create short self-explanatory tutorials that could help students navigate through online databases, in addition to or substituting a live instruction class for the same.
- It is essential to plan for adequate equipment and infrastructure, develop strategies to integrate useful media applications, and facilitate current multimedia solutions for learning in libraries that align with the ICT growth trends to cater for higher education students’ current and future research needs.
- It would be useful to interview teachers from the universities selected for the student survey with the aim of understanding whether the students and teachers were following the same multimedia trends for learning and pedagogical practices. This mixed-method approach of interviewing the universities selected for survey could add value to the current discussion and findings of quantitative research.

**Conclusion**

This study aimed to understand students’ multimedia preferences in libraries; the factors that influenced their choices; their academic behavioural impact on their choices; and the effect of uneven ICT advancements on their preferences. The research found that the academic nature of a student – artistic, academic or both (i.e. visualisers or verbalisers) – did not influence their choice of method of instruction – live (verbal) instruction or video (visual) – and thus did not support the aptitude–treatment interaction hypothesis. ‘Lack of training’ was the most significant constraint affecting students’ potential for multimedia learning in libraries. The majority of the students believed that multimedia was a useful learning tool and helped them retain more information in the long term, but the major reason why they could not maximise its usage was their lack of training.
It was significant from the responses that most students chose at least one kind of instruction (online, in person or blended) for learning about library resources – information literacy or online databases – rather than learning without instruction. Moreover, the university’s country impacted the students’ multimedia learning in some aspects but not all. For example, most students from Kenya chose ‘connectivity issues’ as their primary constraint. Finally, the research found that most students preferred the length of instruction to be 15–20 minutes in a face-to-face class or watching an online video, but their attention span would be longer in a live instruction class than for viewing a video.

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education curricula and delivered presentations and talks on the same in Africa and Europe. He is the recipient of the International Teacher’s Olympiad Award of Merit for being in the top percentile of teachers globally. His interest lies in digital and data literacies, and his review of Tibor Koltay’s (2021) *Research Data Management and Data Literacies* was published in the *Journal of Information Literacy*. 
Knowledge management for climate change in South Africa: A proposed strategy

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Abstract
This article investigates knowledge management for climate change in South Africa and proposes a strategy for knowledge management for climate change. The economic, political, social and ecological dimensions of climate change are predicted to pose a threat to the country’s National Development Plan and sustainable development. Given the growing emphasis on knowledge management for sustainable development and the importance of knowledge in the adaptive capacity and mitigation of climate change, knowledge management has been a central response strategy to climate change by various government and non-government agencies across the globe. The effects of climate change and the lack of focus on knowledge management for climate change in South Africa makes this an important topic for investigation. A systematic literature search and content analysis of relevant textbooks, articles, policy strategies, frameworks and legislation on knowledge management and climate change was conducted. Climate change, knowledge management and strategies were the keywords that were interrogated in the Scopus, ProQuest, EBSCO, Science Direct, Emerald, Elsevier, Taylor and Francis, Springer, Wiley and Inderscience databases to ensure comprehensive coverage. The retrieved articles were evaluated for eligibility. After removing 2900 irrelevant duplicate entries that did not entirely address the study’s scope, a descriptive synthesis of the 100 pertinent articles was completed. A strategy for knowledge management for climate change that calls for establishing a Knowledge Management Centre for Climate was proposed.

Keywords
Climate change, knowledge management, South Africa, sustainable development, response strategy, mitigation, adaptation strategy

Introduction
Climate change remains a development challenge of the 21st century across the globe, and South Africa is exploring diverse ways of adapting to and mitigating the impacts of climate change. Information, knowledge and experience are important in the process of adaptation to climate change (Brossard and Lowenstein, 2009; Jairo and Korir, 2019; Nisbet and Scheufele, 2009; World Bank, 1998). Article 7.7 of the Paris Agreement (2015) highlights the principles of knowledge management in terms of the need for sharing information, good practices, experiences and lessons learned, as well as strengthening scientific knowledge. Given the growing emphasis on knowledge management for sustainable development and the importance of knowledge in adaptive capacity and the mitigation of climate change, it stands to reason that knowledge management has been a central response strategy to climate change by various government and non-government agencies across the globe (Brossard and Lowenstein, 2009; Gulla, 2018; Jairo and Korir, 2019; Kenya National Climate Change Action plan, 2012; Nepal Academy, 2016; Niar, 2016; Nisbet and Scheufele, 2009). Although knowledge management concepts, such as the need for coordination amongst sectors and timely access to and sharing of critical information and knowledge,

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are reflected in different climate change adaptation strategies at the national, provincial and local levels in South Africa (National Climate Change Adaptation Strategy, 2019), knowledge management is yet to be considered an essential element in the country’s response strategy. The Intergovernmental Panel on Climate Change’s (2014) Fifth Assessment Report notes that climate change has the potential to reverse the gains made by the Millennium Development Goals and impede the country’s ability to achieve the United Nations’ 2030 Agenda for Sustainable Development.

The economic, political, social and ecological dimensions of climate change are predicted to result in a further widening of the gap between the rich and poor in South Africa, where the legacy of apartheid is still evident, thus posing a threat to the country’s National Development Plan, which charts the development and progress of the country until 2030. This is also contravening the human right to healthy environmental and sustainable development reflected in Section 24 of the Bill of Rights of the Constitution of the Republic of South Africa (1996). The president noted in the State of the Nation Address (2021) that the country’s public electricity utility, known as Eskom, has committed to achieving net-zero emissions by 2050. Against this backdrop, this article provides an overview of knowledge management and climate change from a South African perspective and proposes a strategy for knowledge management for climate change in the country.

The study is guided by the following objectives:

- To explore climate change and knowledge management within the South African context;
- To establish the need for knowledge management for climate change in South Africa;
- To propose a strategy for knowledge management for climate change in South Africa.

Research methodology

A systematic content analysis of the literature was based on studies published during 1958–2023. Searches were conducted from March 2021 to December 2022. It was necessary to situate the key themes and research questions of the study from the year the key concepts of the study emerged, and to review the progress in the field to establish the current state of research. For example, literature on knowledge management as one of the key themes of study emerged from 1958 to 1978. The most significant and relevant publications and leading authors were from 1986 to 1998. The literature on knowledge management has progressed from 1999 to date. On the other hand, literature on knowledge management for climate change and sustainable development emerged from the Brundtland Commission in 1987 to the World Bank Report of World Bank (1998), with a substantial increase in research on climate change and sustainable development from 2014. A review of relevant textbooks, articles, policy strategies, frameworks and legislation on knowledge management and climate change was conducted from Scopus, ProQuest, EBSCO, Science Direct, Emerald, Elsevier, Taylor and Francis, Springer, Wiley and Inderscience to ensure comprehensive coverage of the literature. Internet searches on various climate adaptation strategies, official statistics, reports and legislation were also conducted to facilitate understanding of this research. Moreover, a desktop review and analysis of the institutional strategies and climate change action plans of development partners, international and national non-governmental organisations, the World Bank and the International Institute for Sustainable Development was conducted. The first phase of the content analysis was to interrogate the databases and search engines with the study themes and synonyms related to the research questions, and determine the preliminary relevance of the manuscripts. The searches produced a total of 3000 records. The second phase of the analysis focused on screening the abstracts and primary bibliographic data and titles, and eliminating duplicate results, to determine their relevance to the study objectives. In total, 100 actual records were examined for significance using the eligibility requirements in Table 1. These included articles from Quartile 1 to 4 journals, books from reputable publishers and grey literature in the form of technical reports, policy frameworks and legislation. During the third phase, the researcher skimmer through the different studies to evaluate the quality and eligibility of the resources. In the fourth and final phase, the researcher reviewed the literature and thematically extracted and synthesised the applicable information on the different themes related to the research questions. The characteristics of the selected studies in terms of title, year, language, country, type of study and type of metrics are presented in Table 1.

Literature review

This section presents literature on climate change and knowledge management and an overview of different frameworks on climate change and knowledge management. It also reviews literature on climate change within the South African context and highlights the
need for knowledge management for climate change in South Africa.

**Climate change in South Africa**

Climate change is the variation of global atmospheric weather patterns resulting from a rise in the temperature of the earth’s surface, often referred to as ‘global warming’ and attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods (United Nations Framework Convention on Climate Change, 1992). Global warming is in part due to the emission of greenhouse gases associated with the effect of the development of human activities such as burning fossil fuels, biomass burning, cement manufacturing, cattle and sheep rearing, deforestation and other changes in land use.

The United Nations Framework Convention on Climate Change, the 2015 Paris Agreement and the Kyoto Protocol recognise mitigation and adaptation as complementary policies to respond to climate change. The 2015 Paris Agreement seeks to achieve the stabilisation of greenhouse gases and keep global warming well below 2 °C by 2100 and preferably below 1.5 °C compared to pre-industrial levels.

South Africa is a high contributor to global climate change with its significant greenhouse gas emission levels because of its dependence on its energy-intensive, fossil-fuel-powered economy, agriculture and mining sector. It is ranked as the 14th largest emitter of greenhouse gases due to its high reliance on coal (Hausfather, 2018). The South African Risk and Vulnerability Atlas (2018) projected that temperatures in South Africa can be expected to rise faster than the global mean temperature, with increases of 3–4 °C along the coast and 6–7 °C in the interior by the end of the century. The country is subject to climate variability and extreme weather, characterised by searing heatwaves, warm winters, cold and rainy summers, thunderstorms, wildfires, droughts, floods and tropical cyclones, resulting in challenges for people’s livelihoods. The effects are increases in vector-borne and waterborne diseases and heat-related conditions, flooded food crops, the depletion of drinking water and the loss of habitable land by those living in informal settlements, as well as increased mortality and mental health issues (Chersic and Wright, 2019). The effects of La Niña in December 2021 resulted in a wetter than normal summer in South Africa in 2022, with several regions experiencing their heaviest rains for close to a century (Sthembe and Njini, 2022). The heavy rain and flooding across KwaZulu-Natal in the south-eastern part of the country in April 2022 resulted in the country’s deadliest natural disaster in recent times. Figure 1 provides an overview of some of the causes of climate change in South Africa and its effects.

**Climate change initiatives in South Africa**

Bearing in mind the impact of climate change in South Africa as noted in the preceding section, the country is making significant efforts at the national and international levels by enhancing the transition to a lower-carbon economy, although with little priority on knowledge management initiatives, as noted in the subsequent sections.

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Table 1. Characteristics of selected studies.

<table>
<thead>
<tr>
<th>Title</th>
<th>Knowledge management and sustainable development</th>
<th>Knowledge management and climate change</th>
<th>Knowledge management and climate change in South Africa</th>
<th>Frameworks for climate change knowledge management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metrics</td>
<td>Acceptance rate of journal</td>
<td>High citation score</td>
<td>Reputable publisher</td>
<td>Quartile 1 to 4 journals</td>
</tr>
<tr>
<td>Language</td>
<td>English</td>
<td>Conference proceedings, books, dissertations</td>
<td>Legislation, reports, policies</td>
<td>Working papers, newsletters</td>
</tr>
<tr>
<td>Study type</td>
<td>Research articles</td>
<td></td>
<td></td>
<td>Government documents, speeches</td>
</tr>
<tr>
<td>Countries</td>
<td>All countries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Databases/ engines</td>
<td>EBSCOhost, Scopus</td>
<td>Google Scholar</td>
<td>Web of Science</td>
<td>Wiley, Inderscience</td>
</tr>
</tbody>
</table>

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At the international level, South Africa is a signatory to all of the policies of the international initiatives and treaties. It ratified the United Nations Framework Convention on Climate Change in 1994 and the related Kyoto Protocol in 1997. It signed the Paris Agreement of 2015 and the Sustainable Development Goals 2030. It also signed the Sendai Framework for Disaster Risk Reduction 2015–2030 and adopted the decision on biodiversity and climate change in 2016 at the Conference of the Parties at the Convention on Biological Diversity in Cancún (UNEP, 2016: 34).

At the national level, the climate change response objective is informed by the National Development Plan 2030, the Bill of Rights, Section 24 of the Constitution (1996) and the National Environmental Management Act 107 of 1998. South Africa’s National Climate Change Response White Paper (Department of Environmental Affairs, 2011) is a seminal document that presents the country’s climate change response strategy. Although it adopts a sectoral approach, Section 10 of the White Paper notes the need for coordination and the alignment of policies and action as central to achieving climate resilience. It also highlights the critical need for best-practice knowledge-sharing across provinces and municipalities. The country has also made significant strides in the integration of climate change adaptation in disaster management through the Disaster Management Amendment Act (Act No. 16 of 2015). It has a disaster management centre with a disaster management framework that focuses on disasters and disaster risk reduction.

The South African National Climate Change Adaptation Strategy (2016 and 2019) recognises communication and knowledge management, and key enablers, to support and enhance climate resilience in South Africa. The South African National Climate Change Bill, published in 2018 for comments, is a landmark commitment by the country to act on climate change, and it seeks to provide for a coordinated and integrated response to climate change and its impacts by all spheres of government in accordance with the principles of cooperative governance. The Bill mandates that the minister establish a national environmentally sustainable development framework within two years of the Act coming into effect. The Carbon Tax Act (Act No. 15 of 2019) aims to provide for the imposition of a tax on the carbon dioxide equivalent of greenhouse gas emissions.

The lead agency for climate change response in the country is the Department of Environmental Affairs and Tourism. Also, different sectors of the economy, including the national, provincial and local governments, are involved in climate change. The stakeholders involved in climate-related disciplines are universities, academic and research institutions,
science councils, researchers, social scientists, technologists, policymakers, non-governmental organisations, civil society and citizens. Other institutions that generate climate-related research in South Africa are governmental agencies such as the South African Weather Service and Department of Science and Technology, and non-governmental and community organisations.

South Africa has the most advanced research, observation and climate-modelling programme on the African continent. The two key centres for climate modelling in South Africa are the University of Cape Town’s Climate System Analysis Group and the Council for Scientific and Industrial Research, which focuses on global and regional modelling for seasonal forecasts and decadal to centennial projections, as well as coupling with land surface dynamics. Several researchers are leading and participating in international global-change research programmes and scientific bodies, such as the Intergovernmental Panel on Climate Change. Table 2 presents an overview of the climate change initiatives in South Africa.

<table>
<thead>
<tr>
<th>Stakeholders:</th>
<th>National Development Plan 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Environmental Affairs and Tourism</td>
<td>Bill of Rights, Section 24 of the Constitution (1996)</td>
</tr>
<tr>
<td>South African Local Government Association</td>
<td>Disaster Management Amendment Act (Act No. 16 of 2015)</td>
</tr>
<tr>
<td></td>
<td>National Climate Change Adaptation Strategy (2016 and 2019)</td>
</tr>
</tbody>
</table>

Why knowledge management for climate change in South Africa?

Notwithstanding all these initiatives, research shows that information on climate change remains scattered or isolated, and therefore the poor and vulnerable lack access to the right information and at the right time to adapt and respond to climate change. There is still much effort needed in terms of knowledge-sharing and capacity development between the levels of government (Fombad and Onyancha 2017; National Development Plan, 2030). Some farmers have accused the government of not providing them with information on how to manage their livestock amid climate change (Maponya and Mpandeli, 2012). Climate information and support services play a critical role in providing early warning systems, as well as increasing awareness for building capacity and disaster preparedness to cope with a changing climate.

Information, knowledge and experience are important in determining how and whether adaptation takes place. According to the Intergovernmental Panel on Climate Change (2014) assessment, the amount of accessible climate literature from Africa continues to be significantly low, and this has been worsened by inadequate Internet connectivity and climate information that is either not captured or packaged for online and offline access.

The country lacks a robust national system that provides spatially extensive climate data (Ziervogel et al., 2014). There is no institution to coordinate and manage the generation, codification, sharing and use of climate knowledge within the various sectors and spheres in South Africa, resulting in overlaps and disjointed efforts instead of synergy. André et al. (2017) note that responding to the impact of climate change effectively at the national policy and local planning levels requires robust and comprehensive information and a strong knowledge base. Officials in other departments within spheres of government often do not see climate change as a priority and some even see it as working against national development.
priorities. Coherent policy formulation and implementation remains challenging due to the fragmented nature of who is responsible for climate policy.

The upkeep of people’s livelihoods in the coastal zone largely depends on the degree to which key stakeholders at all levels of decision-making can participate in climate adaptation planning and implementation processes (Sultana and Luetz, 2022). Unfortunately, the implementation of international and national policies and adaptation strategies with the coastal population has been slow, with a top-down approach resulting from a general understanding of climate-change-related impacts on the lives and livelihoods of the coastal people (Cabana et al., 2023; Wong and Aspinwall, 2004). Coastal regions, although vital to the local economy, are especially vulnerable to climate change due to rises in sea levels and the height of waves, coastal erosion, cyclones and flooding (Amaratunga, 2022).

Often, priority is given to scientific knowledge and expert technical and policy documents rather than the lived experiences and perceptions of the more vulnerable communities who are at risk of climate change. Climate change may be effective when it is complemented by the specific local knowledge generated by the experiences of the affected people themselves. Local knowledge is important in adaptation studies as they should not only include information about the climatic impact at the micro level, but also incorporate understanding about the local socio-economic and political structure within which adaptations must take place (Ayers et al., 2014).

In addition, although much of the information and knowledge on climate change in South Africa is generated by different stakeholders and institutions, these are mostly embedded within institutes and organisations. This has led to the creation of climate-knowledge silos in the country. A question worth asking is: How does research on climate science, impacts and vulnerability integrate with sectoral and cross-sectoral decision-making? Figure 2 provides a summary of the motivation for knowledge management and climate change in the country.

**Knowledge management**

Knowledge management is defined differently in the literature by various researchers given that it is a cross-functional and multifaceted discipline. It is widely accepted that knowledge management refers to strategies and practices that are used to identify, create, represent, distribute and enable the adoption of insights and experiences for competitive advantage and effective decision-making. It is not only regarded as an important activity within organisations but also influences many activities outside organisations. For example, it is an essential element for the achievement of the Sustainable Development Goals and human development.

![Figure 2. Key issues for knowledge management for climate change in South Africa.](image)
The concept of Knowledge management has evolved over the years from what may be termed the ‘first generation’ of knowledge management to the ‘fourth generation’ of knowledge management. The first generation of knowledge management focuses on information and knowledge management in organisations. The second generation is linked to an individual, social, organisational and business perspective, focusing on knowledge collaboration and social networking. The third generation is the information-system perspective, which involves the arrangement and management of content through taxonomy construction. It also involves the use of artificial intelligence, machine learning, data analytics, the Internet of Things and other emerging developments.

The fourth generation of knowledge management considers knowledge management as an indispensable ingredient in human developmental strategy (Fombad and Onyancha, 2017). To this end, knowledge management captures and shares good practices, which may feed into development policies and programmes and provide a knowledge-focused perspective on finding solutions for the short- and long-term survival and well-being of mankind (Andersson et al., 2015; Bolis et al., 2014; Feil and Schreiber, 2017; Laszlo and Laszlo, 2002; Sayeed, 2021).

Skrzypek (2013) notes that the concept of knowledge management fits with the principles of sustainable development, wherein the integration of political, economic and social activities takes place with respect to the natural environment to guarantee the ability to meet the basic needs of communities of the present generation and future generations.

People, processes, information and communications technologies, learning organisations, knowledge markets, strategies and techniques are the key enablers of knowledge management. Knowledge management processes are social, non-linear, technologically interdependent, intertwined, continuous and dynamic, and enhance the contribution of knowledge in an organisation. Key elements are common in the definitions of knowledge management processes – for example, acquisition, creation, storage, retrieval, transfer, sharing, application and dissemination (Bouthillier and Shearer, 2002; Nonaka and Takeuchi, 1995: 77; Wong and Aspinwall, 2004).

Information and communications technologies facilitate the knowledge management process of identification capturing, creation, sharing, dissemination, acquisition and application. Information and communications technologies not only store knowledge but also connect people in organisations and people to information. Knowledge management systems have evolved as information and communications technology systems that store and retrieve knowledge, improve collaboration, locate knowledge sources, mine repositories for hidden knowledge, capture and use knowledge, and enhance the knowledge management process to an integral component of knowledge management that provides knowledge support to the right user with the right information at the right time. To this end, the definition of knowledge management systems varies from context to context. Galandere-Zile and Vinogradova (2005) define a knowledge management system as a network of contextual data and documents linked to directories of people and skills and providing intelligence to analyse these documents, links, employees’ interests and behaviour, as well as advanced functions for knowledge-sharing and collaboration.

Knowledge management systems are increasingly used to achieve the objectives of climate change mitigation and adaptation by providing the required knowledge support to different stakeholders (Dupar, 2019; Gulla, 2018; Oliveira and Jabbour, 2017). Examples of knowledge management systems are expert systems, knowledge repositories, group-decision support systems, intranets and computer-supported cooperative work, and artificial intelligence (Alavi and Leidner, 2001; Mansor, 2020; O’Leary, 2002).

Knowledge management also seeks to establish collaborative organisational learning and unlearning, whereby errors, failures and environmental uncertainty result in restructuring past successes to fit the changing environmental and situational conditions (Argyris and Schon, 1978; Senge, 1990). Learning increases knowledge and therefore the capacity for effective action. Knowledge management also operates within the market system, where knowledge is exchanged for the reward of other valuable things, such as money, respect, promotion, other knowledge or just the feeling of satisfaction from assisting others (Brown and Duguid, 1998; Davenport and Prusak, 1998; Grover and Davenport, 2001). The different barriers in the knowledge management process may be grouped as individual, organisational culture, leadership, structural, retention strategy, financial, technological and inter-project barriers.

Personification and codification are the two knowledge management strategies (Hansen et al., 1999). Personification deals with tacit-to-tacit knowledge transfer whereby people-to-people methods are used to exchange knowledge. On the other hand, the codification strategy seeks to link people to documents in organisations and enhances explicit-to-explicit knowledge transfers. It is recommended that both codification and personification must be adopted in combination in organisations to obtain the optimal
maximisation of the knowledge resources, with one being predominant over the other.

Personification strategies may take the form of mentoring, debriefing and after-action reviews. Personification also involves the use of social networks, such as communities of practice, knowledge networks, knowledge communities and local networks (Berger and Luckmann, 1966; Brown and Duguid, 1998; Wenger, 2003). A community of practice is a community of individuals with a shared interest who come together to share ideas on problems related to a specific topic and, as a result, learn to do things better. Domain, community and practice are the three key elements to implementing a community of practice (Wenger, 2003). The Asia-Pacific Climate Change Adaptation Information Platform (2023) is a community of practice that has assisted countries in Asia to adapt to the challenges posed by climate change by establishing a regional knowledge-sharing system, generating new knowledge, and applying new and existing knowledge. Virtual communities of practice result from the use of information and communications technologies, such as groupware, collaborative technologies and yellow pages, to link people (Campbell, 1999; Sala-i-Martin and Subramanian, 2003: 77). Wenger (2003) establishes a relationship between a community of practice and knowledge management strategy by arguing that the three key elements of implementing a community of practice (domain, community and practice) provide the key structures to support learning, sharing, stewardship and knowledge.

Codification strategies seek to collect knowledge, store it in databases, and provide the available knowledge in an explicit and codified form to an organisation. Codification entails the use of knowledge management systems such as knowledge repositories and corporate portals to provide a single point of access to online information. An overview of the key elements of knowledge management is presented in Table 3.

**Knowledge management frameworks for climate change**

This section explores the different knowledge management frameworks for climate change that inform the strategy for knowledge management for climate change in South Africa.

The knowledge management element model (Barrantes Briceno and Almada Santos, 2019; Oliveira et al., 2010) involves the exchange of knowledge between stakeholders from the upper level and the target populations in the development process. This model can be adapted to any context to achieve a coherent and optimal result for climate change and sustainable development. It considers eight dimensions of knowledge management – namely, leadership, people, strategy plan, processes, resources, information and knowledge, society and results.

The knowledge management stocks and flows approach is another perspective of knowledge management for climate change. It identifies climate-related knowledge stocks and flows within the destination of climate change knowledge and considers the role of governments as knowledge brokers in facilitating knowledge transfer (Bhandari et al., 2016; Cooper, 2006; Davidson and Voss, 2002; Nacipuch et al., 2017). Knowledge stocks refer to existing knowledge and knowledge sources related to climate change and the destination. Knowledge flows represent the communication or dissemination channels used to transfer information or knowledge. Knowledge management flows examines a destination’s knowledge needs regarding climate change.

The creation of groups with common interests in a knowledge area is crucial when considering knowledge management climate change initiatives. For
example, Chantarasombat et al.’s (2010) five-stage knowledge process model for creating self-reliant communities in Thailand comprises preparation; creating, motivating and promoting participation; developing a knowledge management plan; implementing the plan; and evaluating the process. Moreover, Wiig’s (1993) knowledge management cycle model emphasises the importance of reconstructing, modelling and organising knowledge to facilitate the creation, accumulation, deployment and use of quality knowledge for intelligent actions by individuals as well as organisations. Venkatraman and Venkatraman (2018) draw from Wiig’s (1993) knowledge management cycle model of benefits, tools, organisation, people and processes, and Wenger’s (2003) three elements of a community of practice, to recommend a community of practice approach in addition to a knowledge management system for sustainability. Venkatraman and Venkatraman (2018) draw from Wigg’s (2003) knowledge management cycle model of benefits, tools, organisation, people, and process (BTOPP) and Wenger’s (2004) three elements of CoP, to recommend a CoP approach knowledge management system for sustainability as, business (products/services), customers and resources (people, capital, and facilities). The GEF (Global Environment Facility) Small Grants Programme (United Nations Development Programme 2012) pioneered innovative community-based approaches to knowledge management by capturing lessons, conducting knowledge exchanges, organising training workshops, establishing and nurturing networks, and working with the government in achieving national environmental priorities.

The knowledge management governance framework is another suitable framework for knowledge management and climate change. It recognises the role of stakeholders in knowledge-based processes, including the sociopolitical and cultural contexts where decisions are made. Domke and Pretzsch (2016) note that success in coping with and adapting to climate change depends on the local context and a complex interlinkage between institutional, socio-economic, governance, social and infrastructural conditions and capacities that facilitate the scope of action. This framework facilitates the development of effective knowledge management strategies that enable transformative adaptation (Eriksen et al., 2015; Munera and Kerkhoff, 2019; Van Kerkhoff and Pilbeam, 2017: 32). It also enables the participants to identify interventions that align with, or challenge, societal norms; recognise political contestation over knowledge; and demonstrate different perceptions of reality and visions of the future.

Information and Knowledge Management for Climate Change (IKM4CC) strategic framework: Guidelines for the Pacific region (Griffith University and SPREP, 2016) is a set of guidelines to assist government departments and other agencies and organisations that deal with issues related to climate change in implementing good practices for managing information. It highlights the importance of choosing an information management system that is most suited to an organisation. The strategic framework seeks to identify all the people, systems and processes within a government or organisation that enable the successful creation, management and use of information. These typically include laws, policies, technology, capacity, skills and funding.

According to the United Nations Development Programme Knowledge Management Strategy (2014) knowledge management cyclical framework involves collection and mining by information systems and the generation of knowledge products and services in the form of lessons learned, publications, projects, learning networks, resource kits, the dissemination of knowledge and knowledge uptake (i.e. the steps taken to improve the use of knowledge products and services by validation, conducting workshops, holding specialised courses and training).

The Asia-Pacific Climate Change Adaptation Information Platform (2023) supports research, capacity building for climate change adaptation, policymaking and information-sharing to assist countries in Asia to adapt to climate change impacts. The goal of the platform is achieved through a regional knowledge-sharing system, the generation of new knowledge, and the application of existing and new knowledge. Its main stakeholders are government policymakers, local government development planners, community-level development workers, members of international research and development agencies, and communities that are vulnerable to the impacts of climate change.

Curl’s (2016) knowledge management framework for climate change in Cambodia consists of two support mechanisms (a knowledge management unit and a climate portal) and four application mechanisms (collating information, policies, communication and learning). The World Bank’s Climate Change Knowledge Portal (2021) is a central hub for information, data and reports about climate change around the world where a user can query, map, compare, chart and summarise key climate and climate-related information.

The Nepal Climate Change Knowledge Management Centre (NCCKMC) was established at the Nepal Academy of Science and Technology in 2010 to facilitate the incorporation and implementation of climate
change knowledge into policy development at the national local level with support from knowledge partners (NAST & OPMAL 2016). The NCCKMC has since been facilitating the mechanism through which climate change knowledge is incorporated into policy development and implementation at both national and local level with support from knowledge partners. NAST and OPMAL (2016) proposed a knowledge management framework that will seek to develop a national research strategy on climate change and promote the use of climate change knowledge for improved policy formulation, planning and decision taking on climate change knowledge management.

The AdaptaClima (2018) online knowledge platform supports effective adaptation to climate change in Brazil by allowing users to share information and tools. The project’s objectives are to make available information on priority topics related to climate change adaptation; promote communication and coordination between ‘knowledge producers’ and ‘knowledge users’; and stimulate the production of information in response to the gaps identified.

The Kenyan national climate change response strategy of 2012 envisions the successful implementation of a knowledge management framework that will result in the effective dissemination of climate change knowledge to potential users, especially vulnerable groups. The country’s National Climate Change Action Plan 2013 proposes a climate change knowledge management framework and knowledge management system for Kenya (Kenya, National Climate Change Action Plan, 2012). Kenya has developed a Knowledge Management for Climate Change online portal to increase the creation, validation and dissemination of climate change knowledge and tools. It has adopted a knowledge management framework in its National Climate Change Action Plan (Kenya, 2013).

The One World Foundation India set up and manages the Climate Change Knowledge Portal at the State Knowledge Management Centre on Climate Change, Environmental Planning and Coordination Organisation (EPCO), Madhya Pradesh, India (Gulla, 2018). It serves as a knowledge hub that caters for the information and knowledge needs of policymakers, scientific committees and the public on issues relating to the creation, sharing and dissemination of climate change information.

The different frameworks are summarised in Table 4.

### Proposed strategy for knowledge management for climate change in South Africa

This section draws from the various frameworks for climate change in the preceding section to suggest a strategy for knowledge management for climate change in South Africa. Strategies provide a focus on the methodical and conscious areas for consideration in the knowledge management effort (Earl, 2001; Okunoye, 2004). The proposed strategy of knowledge management recommends a coordinated sectoral stakeholder project and a post-project approach by a knowledge management centre. The strategy calls for policy enhancement on climate change and a knowledge management centre for climate change, which will be responsible for implementing the various aspects of the strategy, resulting in enhanced mitigation and adaptation to climate change, and thus improved sustainable development. The strategy is presented in Figure 3.

### Knowledge management centre for climate change

A knowledge management centre for climate change, led by a chief knowledge management officer, should

### Table 4. Knowledge management frameworks for climate change.

<table>
<thead>
<tr>
<th>Framework</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge management element model (Barrantes Brinceño and Almada Santos, 2019)</td>
<td>Information and Knowledge Management for Climate Change (IKM4CC) strategic framework: Guidelines for the Pacific region (Griffith University and SPREP, 2016)</td>
</tr>
<tr>
<td>Knowledge management stocks and flows approach (Bhandari et al., 2016; Cooper, 2006; Davidson and Voss, 2002; Nacipuch et al., 2017)</td>
<td>Nepal Climate Change Knowledge Management Centre (Nepal Academy, 2016)</td>
</tr>
<tr>
<td>Kenya climate change knowledge management framework (Kenya, National Climate Change Action Plan, 2012)</td>
<td>Climate Change Knowledge Portal at the State Knowledge Management Centre on Climate Change, India (Gulla, 2018)</td>
</tr>
</tbody>
</table>
be created to serve as the hub for climate change knowledge management in South Africa. This could be created within the already existing Disaster Management Unit. Knowledge management has been noted to be one of the essential success factors for disaster management initiatives in many countries (Ahmed et al., 2015; Badpa et al., 2013). The centre could be under the Department of Cooperative Governance and Traditional Affairs, which currently manages the Disaster Management Unit. The centre should also work in liaison with the Department of Forestry, Fisheries and the Environment, which is directly responsible for coordinating climate change in the country. The knowledge management centre for climate change should coordinate and manage the generation, codification, sharing, use, dissemination and accountability of climate change information and knowledge from the national to the local level. This centre should also be responsible for identifying stakeholders and implementing the knowledge management strategy for climate change in the country, as noted in the subsequent sections.

**Stakeholder identification and representation**

It should be the responsibility of the knowledge management centre for climate change to identify and profile all the climate change actors and stakeholders that will be part of the centre. Drawing from the United Nations’ (2007) process for a sustainable development model, it stands to reason that a knowledge community sector by sector approach of the different stakeholders that will be represented at the knowledge management centre for climate change is beneficial. A stakeholder identification approach for knowledge management for climate change was also recommended in India (Gulla, 2018).

The identification of different stakeholders is key in the coordination of climate change activities. The Nepal Academy of Science and Technology and Oxford Policy Management Limited (2016) noted a lack in the coordination of climate change activities, despite the knowledge management centre for climate change established in India, due to the poor relationship between the centre and the different stakeholders. Therefore, drawing from Kenya, National Climate Change Action Plan (2012) success story, the formal mainstreaming of all stakeholders that are generating climate change information and knowledge into the national climate change institutional arrangement will bring immense benefits to the climate change agenda.

The different stakeholders that will be represented in the climate change knowledge management centre could lead the process of collating, sharing, storing and disseminating the climate change knowledge acquired from local and expert communities. The different stakeholders will be able to identify the tacit and explicit knowledge needs of their constituencies in managing the knowledge management process. The stakeholders may also facilitate knowledge creation by tapping into the local knowledge of a stakeholder community.

The notable stakeholders that should form part of the centre are policymakers, representatives from the different government departments directly involved in climate change, the South African Local Government Association, researchers, scientists, concerned citizens, non-governmental organisations, farmers, women, international organisations, members of international research and development agencies, communities that are vulnerable to climate change impacts, and the media. South Africa is one of the most culturally diverse countries in the world in terms
of race, language and ethnic groups (Finestone and Snyman, 2005). The diversity of the country is an important factor to be considered in the composition of the stakeholders.

**Knowledge management strategy**

As well as identifying the different stakeholders, it is important for the knowledge management centre for climate change to design a knowledge management strategy for climate change that draws from the information and knowledge needs of the knowledge community and is aligned with the country’s adaptation and mitigation response strategy. A knowledge management strategy will facilitate the sharing of the internal, indigenous, local and hidden knowledge held by individuals in rural communities. A dominant personification (social networking and collaborative initiatives) strategy with element codification (information and communications technology initiatives) is recommended. This is because a personification strategy is a people-centric strategy that seeks to transfer, communicate and exchange knowledge between individuals, and vulnerable communities are looking for solutions to problems generated by scientific knowledge regarding the impact of climate change on their day-to-day activities. A personification strategy will facilitate the sharing of reliable, accurate and up-to-date data and first-hand experience on climate-related events generated by those who are the worst hit by climate change, such as smallholder farmers, fishermen, rural communities and women.

A personification strategy will necessitate actions such as communities of practice, community participation, learning processes, storytelling, mentoring, rewards, informal chats, after-action reviews, benchmarking and lessons learned, conferences, seminars and training sessions, knowledge communities and community gatherings. These are a few examples of personification strategies for climate change and a knowledge management system that will integrate the current scattered knowledge on climate change from the different sectors and stakeholders, which currently exists in silos.

Communities of Practice will enable stakeholders in the same community with common interests to come together to share and learn from each other. Through mentoring and storytelling, experienced farmers or scientists may work together with younger and inexperienced farmers or scientists to pass down their knowledge. Mchombu and Mchombu (2014) observe that mentoring sessions between commercial farmers and communal farmers in Namibia fostered knowledge-sharing and empowered poor farmers. The Women4Climate programme (City of Vancouver, 2019) is a 10-month mentoring initiative whereby business sector leaders in climate change are matched with emerging female leaders in climate change to share their knowledge and experience and advance the women’s leadership skills. The lessons learned through community projects should be used in the solving of problems.

To foster learning, errors made by stakeholders in any project should not be recognised as failures but as sources of information. Those involved in a project should be willing to discuss past experiences and promote new knowledge (Chantarasombat, 2011; Nair, 2016). An effective lessons-learned process should prevent stakeholders from repeating their mistakes and allow them to repeat their successes. This should be an instrumental part of any organisation’s overall continuous improvement process.

The different stakeholders in the knowledge management centre for climate change should be able to organise conferences, seminars, training sessions and community gatherings to transfer information and knowledge on climate change to the community. In a study on knowledge management for climate change in Ethiopia, farmers mentioned the importance of training by community experts once a year on soil and water conservation activities (Domke and Pretzsch, 2016). Moreover, individuals should be rewarded and provided with incentives for contributing, documenting and sharing information on climate change at the knowledge management centre for climate change. The United Nations Development Programme has created a ‘Knowledge Awards’ incentive to encourage staff to produce learning documents and share their climate adaptation knowledge with others (Adaptation Fund, 2020).

A knowledge management system should be designed at the knowledge management centre to capture and repackage information, bearing in mind the needs of the different sectors of the community. Such a knowledge management system would ensure that there is a linkage between the different stakeholders, from rural communities to international committees, to contribute, explore, evaluate, synthesise and learn about climate-related information and knowledge, and priority topics related to climate change adaptation and mitigation.

The availability of reliable, affordable and appropriate knowledge management systems in the form of communication channels that take into account the diversity of South African society will meet the needs of the different audiences, particularly poor and vulnerable communities. It is also worth repeating that South Africa is one of the most
culturally diverse countries in the world in terms of race, language and ethnic groups. Language difficulties can easily result in misunderstandings and frustration because people may not know how to share information or communicate their opinions clearly (Finestone and Snyman, 2005).

The use of community radios, mobile phones, local television stations at the grass root level to communicate climate change information will facilitate the access, flow and dissemination of climate information knowledge. (Prynoy 2004; Yannill & McLean 2010). An urgent message sent via community radio to alert the community to the likelihood of an extreme whether condition, weather forecasts, food aid distributions, emergency guidelines and financial support will be very beneficial. Information and knowledge on climate change may be transmitted in the form of short dramas, stories, videos, and environmental campaigns through the different communication channels using the local language of the community. Rural infrastructural development and an enhanced internet accessibility and connectivity will enhance the use of these traditional forms of communication.

The knowledge management centre for climate change could collaborate with community outreach centres, schools and churches to serve as a gathering place for the dissemination of vital information on climate change. At the local level, traditional leaders and political councillors could be involved in imparting information on climate change to their communities. Information and knowledge on climate change can be transmitted in the form of short dramas, stories, videos and environmental campaigns through these different communication channels using the local language of the community.

On the other hand, web-based technologies, email, videoconferences, ‘smart’ applications, blogs, groupware systems, the intranet and extranet, decision support systems and document management systems, briefs and other printed sources may be used as sources of information dissemination to the literate community (Gulla, 2018). It has been noted that a knowledge management system may strengthen institutional memory, improve people’s understanding of what works well in climate change adaptation, and lead to more effective projects and programmes (Adaptation Fund, 2020). It makes it possible for the explicit knowledge that inundates local communities (such as international treaties and polices, data information statistics on climate change, research publications, and other global information and policies on climate change) to be documented.

**Governance structures for the successful implementation of knowledge management for climate change**

Several governance structures will be required to facilitate the successful implementation of the knowledge management strategies and initiatives at the knowledge management centre. These could take the form of a review of relevant policies, climate change governance, a resource centre for climate change, and monitoring and evaluation.

**Development of relevant policies and legislation on climate change.** There is a need to re-examine the relevant policies, legislation, Acts and bills to establish a clear vision for climate knowledge management adaptation and mitigation. Therefore, the country’s existing Disaster Management Amendment Act (Act No. 16 of 2015), which currently focuses on disasters and disaster risk reduction, should be amended to include aspects of climate change, such as the importance of the identification, generation, management and dissemination of climate-related knowledge management information. The amended Act should also make provision for the creation of a knowledge management centre for climate change. The Philippines Climate Change Act of 2009 (RA 9729), for example, mandates the overseeing, establishment and maintenance of a climate change information management system and network. Also, the South African Climate Change Bill of 2018, which is still open for amendments and currently places little emphasis on knowledge management, should include a clause on the importance of knowledge management in the national sustainable development framework. It is also important for each climate stakeholder sector to design its own climate change policy tailored to its needs.

**Climate change governance.** A country’s overall governance framework can enhance communities’ trust in the government. The government should play an active role in supporting the climate change initiative and bringing about shifts in interest and perceptions on climate change through an active mitigation and adaptation policy. It would mean a lot to the poor and vulnerable if senior representatives of the government served as brokers in delivering information directly to those at the grass-roots level in the form of workshops (Nacipuch et al., 2017). Good leadership would facilitate policy development and implementation, and provide financial support and capacity development for the knowledge management centre. Domke and Pretzsch (2016) note that farmers and their families trusted and followed governmental
extension services, despite some complaints about unacknowledged requests, because governmental entities were the most dominant and visible. The government should encourage a culture of trust, understanding, support and openness amongst the diverse groups in the country (Finestone and Snyman, 2005). Good leadership could foster rural infrastructural development in the form of enhanced Internet accessibility, and connectivity would enhance the use of traditional forms of communication.

Resource centre for climate change. As well as the knowledge management centre for climate change, a national resource centre for climate change information could be created within the National Library of South Africa to serve as a physical space for climate-change-related information. The climate change resource centre could also have a live exhibition area for raising awareness of climate change. In this regard, the national resource centre could liaise with public libraries at the provincial and local levels to provide physical spaces for climate information. The knowledge resource centre could also liaise with the knowledge management centre for climate change and serve as an essential platform for communities of practice, mentoring, social networking, knowledge creation and participation by the poor (Adaptation Fund, 2020). Similarly, Kanya (2012) recommends that a climate change knowledge resource centre should be part of the climate change response strategy in Kenya.

Monitoring and evaluation. A mechanism for monitoring and evaluating the application of climate change knowledge management by the different stakeholders and sectors involved in climate change knowledge management will ensure the long-term success of climate adaptation and mitigation initiatives, and enhance accountability and sustainability for climate change. The monitoring and evaluation of climate change was highlighted as key to the 2016 and 2019 climate change adaptation strategies of South Africa. It is important that monitoring and evaluation issues are discussed up front with the various stakeholders in terms of when and how to monitor and when and how to assess the impact of knowledge management. In suggesting monitoring performance in terms of well-defined deliverables or outcomes in India, Gulla (2018) noted a monitoring and evaluation system, and a feedback mechanism, to collect, analyse and report on the outcomes of the knowledge management strategy. Hulsebosch et al.’s (2009) ripple framework model indicates that monitoring involves tracking progress over time throughout the whole knowledge management process, while evaluation aims to assess progress at a fixed point in time.

Conclusion
This study has proposed a strategy for knowledge management for climate change in South Africa that advocates for a review of relevant policy, a knowledge management centre for climate change, a personification strategy and adequate governance structures. Climate change continues to threaten and undermine the attainment of almost all the Sustainable Development Goals in the country, and remains a noticeable threat to food security, water resources, agriculture, forestry, the health sector, maize production, plant and animal biodiversity and rangelands, human settlements, and disaster risk reduction and management, thus resulting in an impact on sustainable development. Therefore, how we respond to climate change should not be in terms of how hard a drought hits and how many policies and strategies are in place, but in terms of knowledge of the impact of the climate and a willingness to response to it. Managing knowledge for climate change is a step in the right direction for climate action and attaining the Sustainable Development Goals.

Considering that the study’s methodology is a literature review, there is a need for stakeholder-sector-specific empirical studies to assess the implementation of elements of the strategy. Given the strong connection between climate change and agriculture, and the devastating effect of climate change on the agricultural, water, forestry, biodiversity and human settlement sectors, a starting point may be to implement the strategy within the agricultural sector among smallholder farmers, fishermen and women in these communities. This article advances the field of knowledge management by looking at knowledge management dynamics at the developmental level. The research adds to the body of knowledge on knowledge management as a tool for development and lays the foundation for broader empirical research on knowledge management and climate change.

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Exploring the research domains, gender gap and labour market perspectives of doctoral research in library and information science in India

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Abstract
The present study aims to analyse the research domains, gender gap, and labour market perspectives of doctoral research in LIS in India. Sodhganga, a digital repository of Indian thesis and dissertations, was used for extracting doctoral thesis information and Jarvelin & Vakkari classification system was used for categorising the doctoral research topics. A total of 808 doctoral dissertations awarded between 2016 and 2020 were analysed using IBM SPSS and Tableau. The study’s findings revealed that the growth of doctoral research in LIS is on rising trends with 150 PhD awarded in LIS every year. Information seeking (33.8%), library and information service activities (30.7%), and scientific & professional communication (16.5%) were found to be the preferred research themes among doctoral students during the study period. Furthermore, it is revealed that there is a gender gap in the number of PhDs conferred, with more men than women receiving these degrees. LIS professionals with a doctorate have the highest employment rate, at 96.2%, and most are in government jobs. Besides, only 40 percent of doctoral candidates reported receiving an incentive after the doctoral degree.

Keywords
Library and information science, doctoral thesis, gender, employment, India

Introduction
Library and information science (LIS) education and research in India has seen significant growth in the past few decades, with an increasing number of individuals pursuing doctoral research in this field. The increasing number of LIS departments, trained LIS professionals and LIS teachers has catapulted the growth of LIS research in India. Simultaneously, there is a growing interest in doctoral research, alongside writing for academic journals or publishing books in LIS domain. Doctoral research holds significant importance in the academic world as it mirrors the highest level of scholarly pursuits in a subject.

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Doctoral studies play a vital role in showcasing trends in research. Doctoral scholars are often at the forefront of cutting-edge research, pushing the boundaries of knowledge in their field. There were very few PhDs awarded in LIS in the initial year – for example, up to 1970, there were only 5 PhDs awarded (Varalakshmi, 1994). The growth of doctoral research started in the 1980s, with 103 PhDs awarded during this period. Singh and Babbar (2014) reveal that a total of 1754 PhDs was awarded up to 2012, whereas a recent study by Kumar and Thakur (2022) reports that 1271 PhDs were awarded between 2010 and 2019. Every year, India produces more than 150 PhD students. The large number of doctoral degrees awarded raises many questions – namely, with regard to the subject areas, quality of the PhDs, gender gap and employability of PhD scholars.

Over the last three decades, many research studies have been conducted to explore doctoral research trends in LIS (Chandrashekar and Ramasesh, 2009; Chatterjee et al., 1995; Kannappanavar and Vijayakumar, 2000; Kumar and Thakur, 2022; Lahiri, 1996; Madasamy and Alwarammal, 2009; Mahapatra and Sahoo, 2004; Manjunatha and Shivalingaiah, 1998; Mestri, 2008; Mundhial et al., 2022; Pandita and Singh, 2017; Roy and Dey, 2014; Shivalingaiah et al., 2009; Singh and Babbar, 2014). All these studies have primarily focused on analysing the research trends without considering other critical aspects of doctoral research – namely, the quality of the doctoral research, gender gap and employability of PhD scholars. While men have traditionally dominated the field, there has been a notable increase in women pursuing doctoral research in LIS in recent years. However, despite this progress, there are still persistent gender gaps that exist within the field, particularly in terms of representation in academic and research positions. There is hardly any study conducted in India to gauge and explore the gender gap and employability of LIS doctoral recipients. Against this backdrop, this article explores the research domains, gender gap and labour market perspectives of doctoral research in LIS in India. Through a comprehensive review of existing literature and data, the article analyses the current state of doctoral research in LIS in India, focusing on the gender gap and its implications for the labour market. The study examines the research domains currently being explored by doctoral students in LIS to identify potential areas for further research and development. Comprehensive research on the growth of doctoral research in LIS, including the gender gap and employability of LIS doctoral researchers, ensures academic rigour while addressing the challenges and promoting inclusivity in LIS research. The findings of this article will contribute to the existing body of knowledge on doctoral research in LIS in India, and provide insights into the current state of the field and its future prospects. The article will be of interest to researchers, educators and policymakers involved in developing and advancing LIS education in India.

**Literature review**

A review of the literature was carried out on LIS research trends vis-à-vis doctoral research. The purpose of doctoral education is to foster academics who promote scholarly endeavours and discover new knowledge (Golde, 2006). Doctoral graduates have the highest educational attainment and are primarily trained to conduct research (Sarrico, 2022). Doctoral research also helps us to understand the current research trends in a subject. Of late, doctoral research in India has increased significantly across all disciplines (Ministry of Education, 2023), and India ranks third in the world in terms of its number of PhD students (Singh, 2022). PhD enrolment data for LIS shows that there has been a constant increase in the number of PhD students, from 433 in 2011–2012 to 733 in 2017–2018 (Pandita and Singh, 2020). During the last three decades, few studies have been conducted to analyse doctoral research in LIS across the globe and understand the research trends and emerging research areas.

One of the earliest articles that deals with international LIS research trends is by Järvelin and Vakkari (1990). The authors used their own classification scheme to identify popular LIS research topics. The study found that LIS services and activities were the most popular research theme, followed by information storage and retrieval. Popular subthemes were information retrieval, collections, the profession, administration and planning, and classification and indexing. Kumpulainen (1991) used Järvelin and Vakkari’s (1990) classification scheme to determine the trends in LIS research in 1975. The results of the study reveal similar research trends to those found by Järvelin and Vakkari (1990). Järvelin and Vakkari’s (1993) study reveals a considerable shift in the focus of LIS research over three time periods: 1965, 1975 and 1985. The principal research themes were still information storage and retrieval and LIS services and activities. Tuomaala et al. (2014) analysed articles published in 2005 and compared them with the analysis of the 1965 and 1985 data. The results show that information retrieval was a popular theme, while research on LIS services and activities had slowly decreased since 1985, and research on the topics of...
information seeking and scientific and professional communication had increased significantly. The most recent study by Järvelin and Vakkari (2022) notes that research on LIS services and activities has decreased, and there has also been a decline in research on information storage and retrieval.

Analysing doctoral research in the USA, Shu et al. (2016) reveal that doctoral research was predominantly conducted on information science topics. In their study, Zong et al. (2013) reveal that ontology, the Semantic Web, e-governance, knowledge management, innovation, digital libraries, information needs and information resources were the major topics of doctoral research in China. Moreover, research evaluation, corporate and government services, resource construction, networks, communities, knowledge management, informetrics and innovation in library services have been shown to be preferred doctoral research topics (Song et al., 2021). Wang et al. (2022) reveal that doctoral research in China from 2011–2020 primarily focused on online information behaviour and information services. The themes of LIS doctoral research have changed substantially in China and the USA – library science is no longer a research topic.

Macauley et al. (2010) report that librarianship, information retrieval, information organization and human information behaviour were doctoral research topics in Australia. Tveit (2017) found that, in the Nordic countries, most doctoral research was done on information behaviour, followed by knowledge organization, information retrieval, and the sociology of culture and literature. Moreover, libraries, culture and society were also the focus of doctoral research. In the Global South – for example, Pakistan – doctoral research focused on user behaviour, information literacy, LIS education, and research methodology and standards (Zareef et al., 2023). Chatterjee et al. (1995) found that user and use studies, academic libraries, bibliometrics and citation, library movements and legislation, public libraries, and reference and information sources were the main topics in LIS doctoral research in India, and Lahiri (1996) reveals that doctoral research was conducted on bibliographic control, including indexing, cataloguing, classification and thesauruses, in addition to bibliometrics, user studies and academic libraries.

Studies on users, bibliometrics and citation have been found to be popular across LIS research (Kannappanavar and Vijayakumar, 2000; Mahaputra and Sahoo, 2004; Manjunatha and Shivalingaiah, 1998; Mestri, 2008). Analysing doctoral theses from 1957 to 2008, Chandrashekara and Ramasesh (2009) report that bibliometrics, scientometrics and informetrics were the main topics of LIS doctoral research, accounting for 10.6% of submissions. The extant studies indicate that bibliometrics and scientometrics, as well as user studies and information seeking, have been the most prevalent research topics among PhD students over the years (Kumar and Thakur, 2022; Mestri, 2008). Mundhial et al., 2022; Shivalingaiah et al., 2009; Singh and Babbar, 2014). Research on libraries (academic, public and university) has also been popular with doctoral students (Chandrashekara and Ramasesh, 2009; Mestri, 2008). Mahaputra and Sahoo, 2004; Manjunatha and Shivalingaiah, 1998).

Mestri (2008) reports that academic libraries were the most prominent research topic between 2001 and 2007. Several doctoral theses have also been written on the LIS profession (Kannappanavar and Vijayakumar, 2000; Roy and Dey, 2014; Singh and Babbar, 2014). Of late, there has been a surge in LIS doctoral research on information-technology-related subjects, such as library automation and information and communications technology (ICT) applications in libraries. Webometrics is a developing topic in doctoral research, along with networks, consortiums and library automation (Singh and Babbar, 2014). Recent studies (Kumar and Thakur, 2022; Mundhial et al., 2022) reveal that bibliometrics and scientometrics, ICT in libraries and information seeking were the three dominant themes in LIS doctoral research in India. These studies show that doctoral research on bibliometrics and scientometrics topics has witnessed a significant increase in popularity. The literature reviews reveal that LIS doctoral research has primarily focused on bibliometrics and scientometrics, information seeking and library studies. In addition, automation and digital libraries have been popular thesis topics.

There is a paucity of literature available on the subject of the gender gap, as well as the employability of LIS doctoral researchers. A few studies have been conducted on doctoral research trends. However, there is hardly any research on possible gender disparity, including labour market perspectives, in LIS doctoral education in India per se. Therefore, an extensive study that aims to examine the doctoral research domain vis-à-vis gender difference and employability is deemed essential.

Research objectives and questions

The overarching objective of the present study is to analyse the current state of doctoral research in LIS in India, focusing on the research domains, gender gap
and implications for the labour market. The study attempts to achieve the following objectives:

- Investigate the growth and development of doctoral research in LIS in India;
- Examine the domain of doctoral research in LIS in India;
- Explore the gender gap in doctoral research in LIS in India;
- Investigate the employability of doctoral students in LIS in India.

In view of these objectives, the following research questions were formulated:

1. What is the growth of doctoral research in LIS in India?
2. What are the main trends of doctoral research in LIS in India?
3. Is there any gender gap in doctoral research in LIS in India?
4. What is the value of a doctoral degree in LIS in the labour market?

Methodology

In order to achieve the research objectives, the study used both quantitative and qualitative research approaches to explore the current state of doctoral research in LIS in India, focusing on the research trends in LIS, gender gap and implications for the labour market. First, Sodhganga, a digital repository of Indian theses and dissertations, was used to extract information on the doctoral theses. Sodhganga was chosen due to its extensive collection of doctoral theses from various disciplines, including LIS. The necessary information – namely, title of the thesis, names of the scholar and supervisor, keywords, year of submission and university name – was extracted from each thesis. The topic of the thesis was determined based on its title; if the title was ambiguous, the researchers checked the abstract for more information. A qualitative analysis approach was employed to analyse the extracted data. Thematic analysis was conducted using Järvelin and Vakkari’s (1990) and Tuomaala et al.’s (2014) classification system. This classification scheme is quite popular and has been used by many researchers to determine LIS research trends (Rochester, 1995; Ward, 1997; Yontar and Yalvaç, 2000). As the system is updated regularly and widely used among LIS researchers worldwide, the researchers used it to classify the doctoral research. Each thesis was classified into a main class and a further subclass.

Second, a structured questionnaire was designed to seek the demographic information (gender, university name, etc.), including the present employment status, of the respondents. Of 808 PhD holders, the questionnaire was administered to 469, whose email addresses were traced from their employers’ websites and social media profiles such as Facebook, Twitter and LinkedIn. A total of 110 respondents participated in the survey, and 106 responses were found suitable for data analysis. The quantitative analysis was performed using descriptive statistics to summarize and present the key findings. The data collected was analysed using IBM’s SPSS 24 and Tableau.

Results

The study analysed the doctoral degrees awarded by central universities, state universities and private universities during 2016–2020. The results reveal that 808 doctoral degrees were awarded during said period; 58.4% (472) of the degree recipients were male and 41.6% (336) were female (see Table 2).

Growth of doctoral research in LIS

The findings reveal that 170 scholars received a doctoral degree in 2016; 192 PhDs were awarded in 2017, bringing the cumulative total to 362; 185 PhDs were awarded in 2018, bringing the cumulative total to 547; and 194 PhDs were awarded in 2019, bringing the cumulative total to 741. Finally, in 2020, 67 PhDs were awarded, bringing the cumulative total to 808 (see Figure 1).

The findings reveal that Tamil Nadu (244) produced the highest number of PhDs in LIS during the study period, followed by Karnataka (109), Maharashtra (86), West Bengal (65) and Gujrat (59). Analysing the PhDs awarded by different types of university, it was found that, in 2016, 170 PhDs were awarded in total, with 22 (12.9%) from central universities, 17 (10.0%) from private universities and 131 (77.1%) from state universities. In 2017, 192 PhDs were awarded, with 18 (9.4%) from central universities, 20 (10.4%) from private universities and 154 (80.2%) from state universities. In 2018, 185 PhDs were awarded, with 19 (10.3%) from central universities, 22 (11.9%) from private universities and 144 (77.8%) from state universities. In 2019, 194 PhDs were awarded, with 18 (9.3%) from central universities, 27 (13.9%) from private universities and 149 (76.8%) from state universities. In 2020, 67 PhDs were awarded, with 12 (17.9%) from central universities, 15 (22.4%) from private universities and 40 (59.7%) from state universities. State universities awarded the highest number of PhDs each year,
accounting for 76.5% of the total PhDs awarded during the study period. Private universities and central universities awarded 101 and 89 PhDs, respectively (see Table 3).

Table 1. Literature on LIS doctoral research.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Time span</th>
<th>Number of theses analysed</th>
<th>Main themes of doctoral research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chatterjee et al. (1995)</td>
<td>1950–1993</td>
<td>212</td>
<td>User and use studies, academic libraries, bibliometrics and citation, library movements and legislation</td>
</tr>
<tr>
<td>Lahiri (1996)</td>
<td>1950–1995</td>
<td>255</td>
<td>User studies, information needs and use, academic libraries, bibliometrics and citation, information sources, bibliographic control</td>
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<tr>
<td>Manjunatha and Shivalingaiah (1998)</td>
<td>1987–1997</td>
<td>255</td>
<td>Academic libraries, bibliographic/bibliometric/citation analysis, user studies</td>
</tr>
<tr>
<td>Kannappanavar and Vijayakumar (2000)</td>
<td>1950–1999</td>
<td>346</td>
<td>User studies, bibliometrics, profession and professional, information technology</td>
</tr>
<tr>
<td>Chandrashekara and Ramashe (2009)</td>
<td>1957–2008</td>
<td>802</td>
<td>Information systems, information-seeking behaviour, university libraries, library management</td>
</tr>
<tr>
<td>Madasamy and Alwarammal (2009)</td>
<td>2003–2008</td>
<td>171</td>
<td>Information sources and services, academic libraries, library and information management, user studies, bibliometrics</td>
</tr>
<tr>
<td>Shivalingaiah et al. (2009)</td>
<td>1980–2007</td>
<td>851</td>
<td>Bibliometrics and literature, user studies and surveys, library automation, information technology applications, human resources development</td>
</tr>
<tr>
<td>Singh and Babbar (2014)</td>
<td>1957–2012</td>
<td>1754</td>
<td>Bibliometrics, scientometrics, webometrics, library personnel, information-seeking behaviour, information services</td>
</tr>
<tr>
<td>Roy and Dey (2014)</td>
<td>2006–2011</td>
<td>243</td>
<td>Bibliometrics, scientometrics, information sources and services, LIS professionals</td>
</tr>
<tr>
<td>Pandita and Singh (2017)</td>
<td>2010–2014</td>
<td>117</td>
<td>Information technology, bibliometrics, scientometrics, citation studies (bibliography), library studies</td>
</tr>
<tr>
<td>Mundhial et al. (2022)</td>
<td>2004–2018</td>
<td>957</td>
<td>Information demands, information-seeking behaviour, information sources, services and systems, library and information centre management, ICT use and impact in libraries, bibliometrics, scientometrics, content analysis</td>
</tr>
<tr>
<td>Kumar and Thakur (2022)</td>
<td>2010–2019</td>
<td>1271</td>
<td>ICT and application in libraries, information-seeking behaviour, bibliometrics, scientometrics, content analysis</td>
</tr>
</tbody>
</table>

Table 2. General information on PhD recipients, 2016–2020.

<table>
<thead>
<tr>
<th>Items</th>
<th>Number of degrees awarded</th>
</tr>
</thead>
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<td>Type of university</td>
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</tr>
<tr>
<td>Doctoral degree</td>
<td>808</td>
</tr>
<tr>
<td>Central university</td>
<td>89</td>
</tr>
<tr>
<td>Private university</td>
<td>101</td>
</tr>
<tr>
<td>State university</td>
<td>618</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>472 (58.4%)</td>
</tr>
<tr>
<td>Female</td>
<td>336 (41.6%)</td>
</tr>
</tbody>
</table>

Main trends of doctoral research in LIS in India

Most doctoral research (33.8%) was conducted on the theme of ‘information seeking’ over the five years of the study period. This research domain accounted for 26.5%, 35.4%, 37.3%, 32.5% and 41.8% of the PhDs awarded in 2016, 2017, 2018, 2019 and 2020, respectively. The second most popular research theme was ‘library and information service activities’, with 30.7% of the awards during the study period; 30.6%, 31.3%, 31.4%, 33.0% and 20.9% of the doctoral degrees were awarded in this area in 2016, 2017, 2018, 2019 and 2020, respectively. This theme shows a relatively consistent percentage of yearly thesis submissions, with a slight decline in 2020. The topic of ‘scientific and professional communication’ was the third most popular research area. This category had the third-highest percentage of awards over the four years.
years with 16.5%. The popularity of doctoral research on this topic was at its peak in 2016 (22.4%), but waned in subsequent years, with 15.1%, 10.8%, 18.0% and 16.4% in 2017, 2018, 2019 and 2020, respectively. Other popular research themes were ‘professions’ and ‘information storage and retrieval’, accounting for 6.4% and 5.7% of the PhDs, respectively. It was found that a very small percentage (below 2%) of the doctoral theses were written on the themes of ‘library history’, ‘education in LIS’ and ‘analysis of LIS’ over the study period.

Furthermore, analysing the titles of the PhD theses based on the subthemes of Järvelin and Vakkari’s (1990) classifications, it was found that, from 2016–2020, 14.7% of the doctoral research was conducted on ‘information-seeking behaviour’, which includes the subfields of ‘study of task-based information seeking’ and ‘other types of information seeking’. In 2016, 15.9% of the theses were submitted on ‘information-seeking behaviour’, but the percentage was down to 10.4% in 2020. The second highest number of doctoral theses focused on ‘other aspects of communication (bibliometrics and scientometrics)’, with 18.8%; 10.4%, 9.2%, 12.9% and 7.5% of the doctoral research was conducted on ‘bibliometrics and scientometrics’ in 2016, 2017, 2018, 2019 and 2020, respectively. ‘Use/users of information channels/sources’ was the third most popular PhD topic during the study period, with 8.8% of the PhD submissions. It is worth noting that this research subtheme accounted for 4.7% of the PhD submissions in 2016, increasing to 14.9% in 2020. ‘User education’, ‘information use’ and ‘collections’ were the other popular subtheme domains, with 7.8%, 5.8% and 5.4%, respectively. The findings show that doctoral research on ‘automation or digital libraries’ had a downward trend, from 5.3% in 2016 to 1.5% in 2020. The least-researched subthemes were ‘information dissemination’, ‘document delivery’, ‘metadata/cataloguing’ and ‘scientific or professional publishing’ (see Table 4).

**Gender gap in doctoral research in LIS in India**

The findings reveal that, in 2016, out of the 170 PhDs awarded, 67 (39.4%) were awarded to female research scholars and 103 (60.6%) to male research scholars.
### Table 4. Themes of LIS doctoral research, 2016–2020.

<table>
<thead>
<tr>
<th>Year of award</th>
<th>n (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>170</td>
<td>41.4</td>
</tr>
<tr>
<td>2017</td>
<td>192</td>
<td>48.0</td>
</tr>
<tr>
<td>2018</td>
<td>185</td>
<td>46.8</td>
</tr>
<tr>
<td>2019</td>
<td>194</td>
<td>48.6</td>
</tr>
<tr>
<td>2020</td>
<td>67</td>
<td>16.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subtheme</th>
<th>Year 2016</th>
<th>Year 2017</th>
<th>Year 2018</th>
<th>Year 2019</th>
<th>Year 2020</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library history</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publishing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education in LIS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library and information service activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Document delivery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collections</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information or reference services</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Library history</td>
<td></td>
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<td></td>
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<tr>
<td>Library and information service activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automation or digital libraries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other library and information service activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Several interconnected library and information activities</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information storage and retrieval</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metadata/cataloguing</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Classification and indexing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information search and retrieval</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Information retrieval</td>
<td></td>
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<td></td>
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<tr>
<td>Information resources</td>
<td></td>
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<tr>
<td>Interactive information resources</td>
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<td></td>
<td></td>
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<tr>
<td>Information seeking</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Information dissemination</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information dissemination channel/structures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of library and information services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information seeking behaviour (further subfield merged)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information use</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Information/knowledge management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scientific and professional communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scientific or professional publishing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citation patterns and structures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Web metrics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other aspects of communication (bibliometrics and scientometrics)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other LIS topic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other discipline</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The gender gap was slightly narrower in 2017, with 81 (42.2%) PhDs awarded to female doctoral students and 111 (57.8%) to male. However, the gender gap widened again in 2018 and 2019, with 74 (40.0%) and 81 (41.8%) PhDs awarded to female scholars and 111 (60.0%) and 113 (58.2%) awarded to male scholars, respectively. In 2020, the gender gap narrowed significantly, with 33 (49.3%) PhDs awarded to female scholars and 34 (50.7%) to male scholars. Overall, the findings reveal that the gender gap in the number of PhDs awarded has been relatively consistent over the years, with male doctoral scholars being awarded a slightly higher number each year. However, in 2020, the percentage of PhDs awarded to female scholars was slightly higher than for male scholars. The data suggests a gender gap in the number of PhDs awarded, with males consistently outnumbering females in all years except for 2020. However, a chi-square test with a $p$-value of .704 suggests that this difference is not statistically significant (see Table 5).

Furthermore, when analysing the gender gap between the doctoral recipients by region, 59 female doctoral scholars received a PhD as opposed to 94 male scholars in the eastern region of India. In contrast, the numbers were 78 female and 124 male scholars in the western region. In the northern region, the number of doctoral degree recipients was approximately equal for males (41) and females (40). Interestingly, many doctoral degrees in LIS were awarded in the southern region – 159 females were reported to have received a PhD in LIS against 213 of their male counterparts (see Figure 2).}

### Value of a doctoral degree in LIS in the labour market

In order to assess the value of a doctoral degree in LIS in the labour market, a survey questionnaire was administered to 469 PhD awardees out of 808 whose email addresses were found through multiple Internet sources. Of these 469 PhD students, 110 participated in the survey, and 106 responses were found to be

---

**Table 5. PhD recipients by gender, 2016–2020.**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Year of award</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>Chi-square</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Female</td>
<td>67</td>
<td>39.4</td>
<td>81</td>
<td>42.2</td>
<td>74</td>
<td>40.0</td>
<td>81</td>
</tr>
<tr>
<td>Male</td>
<td>103</td>
<td>60.6</td>
<td>111</td>
<td>57.8</td>
<td>111</td>
<td>60.0</td>
<td>113</td>
</tr>
</tbody>
</table>

**Figure 2. PhD recipients by region, 2016–2020.**

Note: F: female; M: male.
Table 6. Employment status of PhD holders in LIS.

<table>
<thead>
<tr>
<th>Items</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>102</td>
<td>96.2</td>
</tr>
<tr>
<td>Pursuing postdoctoral</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>research</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>Type of employer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Government</td>
<td>72</td>
<td>70.6</td>
</tr>
<tr>
<td>Private</td>
<td>29</td>
<td>28.4</td>
</tr>
<tr>
<td>Career incentives received</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>61</td>
<td>59.8</td>
</tr>
<tr>
<td>Yes</td>
<td>41</td>
<td>40.2</td>
</tr>
</tbody>
</table>

Among the participants in the survey, 70.6% reported working in a government institution, whereas 28.4% were working in private institutions. Only one PhD recipient said that they were working in an overseas university as a faculty member. Seemingly, PhD holders enjoy a high rate of employment, and the transition to a government job following the attainment of a PhD appears to be rapid. When asked whether they had received any career incentives or increments after completing their PhD, 59.8% of the respondents said they had not, whereas 40.2% reported that they had (Table 6).

Discussion

The growth in the number of PhDs awarded in LIS was phenomenal in the five years covered by the study (2016–2020). The study shows that more than 150 PhD were awarded in LIS every year. The distribution by university shows that a large number (618, 76%) were awarded by state universities, followed by 101 (13%) from private universities and 89 (11%) from central universities. It is surprising that the number of PhDs awarded by private universities (101, 13%) was relatively small. The earlier literature also makes no mention of the growth of private universities in LIS. The subject analysis using Järvelin and Vakkari’s (1990) classification shows that most PhD research was confined to two major topics: ‘research on information seeking’ and ‘LIS services and activities’. These topics accounted for 64% of the doctoral research in LIS. The third most popular research domain was ‘research on scientific and professional communication’, which included bibliometrics and citation research, accounting for around 16% of all research. In line with earlier studies (Mundhial et al., 2022; Shivalingaiah et al., 2009; Singh and Babbar, 2014), the present study reveals that library services, information seeking, and bibliometrics and scientometrics were the three major areas of research among doctoral scholars in India. Studies on information seeking and bibliometrics and scientometrics are popular across LIS research, including journal publications (Dora and Kumar, 2017; Garg and Sharma, 2017). Similarly, supporting the extant literature (Mahapatra and Sahoo, 2004; Singh and Babbar, 2014), information seeking and use was found to be a popular research topic among the scholars. It is possible that doctoral research is clustered around bibliometrics, information-seeking and user studies, and library services. Moreover, the profession, user education/information literacy and collections were popular research themes among the doctoral researchers. This shows that topics which were formerly quite popular – such as library automation, classification and LIS education – have not aroused much interest among researchers. In line with earlier studies (Finlay et al., 2012; Shu et al., 2016), the results also show that doctoral research on core library science themes – such as classification, cataloguing, library services and collections – has declined in the last few years. The research findings align with LIS research internationally (Järvelin and Vakkari, 2022), except that there was a consistent decline in research on information storage and retrieval in India. Of late, the subject of libraries and information has undergone a significant evolution in tandem with the changing landscape of information technology, thereby encompassing new domains of research in LIS – for example, data science and big-data analytics, the Semantic Web, information services and human–computer interaction, information ethics, fake news and privacy. These new research domains need to be included to further enhance the classification scheme.

Gender disparity is one of the primary concerns facing the global research system. PhD programmes in science, technology, engineering and mathematics attract more men than women in the USA (Nature, 2017). Similarly, PhDs are predominantly undertaken by men in India (Banchariya, 2019). The present study has analysed the gender gap in LIS doctoral research. The study’s results show that there is a gender difference in the number of PhDs awarded, with the number of male PhD recipients exceeding that of female recipients every year except 2020. The chi-square test, however, indicates that this difference is not statistically significant ($\chi^2 = 7.04$). Societal pressures and family issues may be deterring women from pursuing doctoral degrees. Addressing the gender gap
in doctoral research in LIS is critical for developing strategies to promote gender diversity and inclusive doctoral education, and enhancing the quality of research. Understanding the prospects and challenges faced by doctoral researchers in LIS in the labour market helps align academic rigour and training with the requirements of higher education institutions. The present study’s findings reveal that LIS professionals with a PhD have the highest employment rate, at 96.2%. For PhD holders, the average unemployment rate is just 2.8%, which indicates the value of a doctoral degree in the labour market. Most are in government jobs and only 28% said they worked for a private company. The survey data shows that 59% of the candidates said they had not received any career incentives or promotions, even though they held a PhD. The results show some disparity between getting a job and the lack of incentives, despite attaining a higher academic degree like a PhD. This underlines the need for a closer evaluation of employment practices and the identification of highly qualified employees in the private and public sectors.

Conclusion

This study has explored the research domains, gender gap and labour market perspectives of doctoral research in LIS in India. The findings of this comprehensive analysis provide valuable insights into the landscape of doctoral research in LIS, including the gender difference and employability of doctoral scholars. The findings reveal that the growth of doctoral research in LIS is on the rise, with 150 PhDs awarded in LIS every year. It was found that 33.8% of the doctoral research in LIS was conducted on information seeking, 30.7% on library and information service activities, and 16.5% on scientific & professional communication. It has been revealed that there is a gender gap in the number of PhDs awarded, with more men than women receiving such degrees. LIS professionals with a doctorate have the highest employment rate, at 96.2%, and most are in government positions.

This study offers some practical implications in advancing new knowledge, identifying research gaps, and informing decision-makers about the gender gap and employment status of doctoral scholars. Despite the many practical implications, the study has certain limitations. The analysis was based on a sample of doctoral theses from Sodhganga, which may not represent the entire population of doctoral research in LIS during the specified period. Moreover, the convenience sampling method used for administering the questionnaire may have caused biases in the sample.

Future studies could be undertaken to analyse the quality of doctoral research and publications, and enhance understanding of doctoral research in LIS in India, by expanding the sample size, including other databases or sources of thesis information, and employing additional research methods. Furthermore, longitudinal research could provide insights into the evolving trends and changes in doctoral research.

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Note

1. See https://shodhganga.inflibnet.ac.in

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**Raj Kishor Kampa** is a multi-faceted professional with 15 years of experience in teaching, library administration, and management. Presently, he is serving as Assistant Professor in the Department of Library and Information Science, Berhampur University, Odisha, India. He obtained Master’s Degree in English Literature and Library & Information Science from Sambalpur University, Odisha, and PhD from University of Rajasthan, Jaipur, India. His research interests include knowledge organization, e-learning, open-source software, open access, and open educational resources.
When a disaster strikes: Are libraries in the Philippines ready?

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Abstract
Disasters, whether triggered by natural or man-made hazards, frequently threaten libraries in the Philippines. Utilizing a mixed-methods approach, this research involved a detailed seven-part survey that was completed by 90 head librarians or officers-in-charge across the country. The findings indicate that many libraries have experienced disasters in the past decade. Despite this, most lack adequate preparedness, with 69 operating without a disaster management plan. This lack of preparedness is attributed to constraints such as limited finances and human resources, among others, along with a perception of low disaster risk. While most libraries have implemented basic emergency protocols, such as alarm systems and emergency kits, and some have insurance and updated emergency telephone trees, these measures fall short of the comprehensive requirements for effective disaster management. The study underscores the vital importance of disaster management plans, adequate equipment, sturdy library structures and strong library networks in disaster preparedness and management. It also calls for urgent action in policy enforcement, capacity building and further research to bolster the resilience of libraries against potential disasters.

Keywords
Disaster equipment, disaster management plan, disaster preparedness, library disasters, library resources

Introduction
The Philippines enacted Republic Act No. 10121 (RA 10121), also known as the Philippine Disaster Risk Reduction and Management Act of 2010, in May 2010. In consonance with the definition of the United Nations Office for Disaster Risk Reduction, RA 10121 defines a disaster as a significant disruption of the normal functioning of a community or society, regardless of scale, stemming from hazardous events that lead to extensive human, material, economic or environmental losses and impacts (Senate of the Philippines, 2010a). Natural or human-made hazards can trigger such events.

The Philippines, an archipelagic country comprising over 7600 islands, is located in the tropical cyclone belt and the Pacific Rim volcanic belt, making it...
highly prone to various natural hazards. These hazards
include typhoons, earthquakes and volcanic eruptions
(UNEP GRID-Geneva, 2022). Consequently, it ranks
among the most disaster-prone countries in the world
(Atwii et al., 2022). Typhoons are especially frequent,
with an average of 20 annually entering the Philippine
area of responsibility, sometimes resulting in significant
damage (Gallo et al., 2019; Philippine Atmospheric,
2021). Due to the country’s location in the Pacific
Rim volcanic belt, earthquakes and the 53 active
volcanoes pose consistent threats to infrastructure,
property and lives (UNEP GRID-Geneva, 2022; Philippine
Institute, 2019; VolcanoDiscovery, 2020). Human-induced hazards, such as fires, civil
disorder and armed conflicts, have also led to loss
of life and property damage, with incidents like the
Zamboanga City crisis and the Battle of Marawi
standing out (Franco, 2017; Rood, 2014).
Disasters in the Philippines also affect cultural
properties like historical sites and libraries (Franco,
2017; Rood, 2014; Superio, Abaday, Oliveros et al.,
2019). Despite the enactment of laws like RA 10121
(Senate of the Philippines, 2010a) and the National
Heritage Act of 2009 (RA 10066; Senate of the Phi-
ippines, 2010b), there remains a lack of specific mea-
sures and clear implementation frameworks to protect
these cultural properties during disasters (Lagrama,
2012). On the other hand, international bodies like
IFLA (2002) emphasize the importance of disaster
planning for libraries – a perspective that is yet to
be fully integrated into Philippine policy.
Despite the country’s susceptibility to disasters,
there is a scarcity of research on library-related disas-
ter studies, with limited studies focusing on specific
geographical areas. A comprehensive literature search
also reveals a lack of studies on disaster preparedness
and management in libraries nationwide. Thus, this
study examined Philippine libraries’ current disaster
preparedness and management, addressing this
knowledge gap. The findings can contribute to
improving policy enforcement and implementation
at the local, national and international levels,
benefitting libraries facing similar circumstances.
Generally, the study aimed to document the disas-
ter preparedness and management of libraries in the
Philippines when facing disasters triggered by nat-
ural and human-made hazards. Specifically, the
study aimed to:

1. Identify the libraries by categorizing them
   according to their geographical location
   within the three primary island groups of the
   Philippines and by specifying their types;
2. Determine the physical structure, number of
   collections, annual library budget and topogra-
   phical location of the libraries in the country;
3. Examine the qualifications and educational
   attainment of the library personnel and if they
   had undertaken training on disaster prepared-
   ness and management;
4. Determine the disaster preparedness and
   management practices of the libraries;
5. Identify the disasters experienced by the
   libraries in the last 10 years;
6. Determine the enabling and impeding factors
   in successfully managing the experienced or
   possible disasters in the future.

As repetitive events, disasters follow a cycle of
essential phases: mitigation, preparedness, response
and recovery. The study used the Disaster Manage-
ment Cycle (DMC) as its guiding framework
(Alexander, 2002). The DMC outlines the govern-
ment’s and stakeholders’ responsibilities at each
stage, playing a crucial role in ensuring effective
disaster management. Mitigation and preparedness
are actions taken before a disaster strikes, whereas
response and recovery activities are conducted post-
disaster (Petak, 1985). Furthermore, the DMC forms
the foundation for the four pillars of disaster risk
management outlined in RA 10121 (Domingo,
2016), which was also consulted in this study.
In the library context, the DMC is a crucial guide
to safeguarding the building, collections, staff and cli-
ents (Petak, 1985). The DMC encompasses four key
actions. First, in the mitigation phase, the library
management identifies and assesses the existing risks,
implementing targeted measures to minimize them.
Next, during the preparedness phase, the library formu-
lates a response plan, trains its personnel and cultivates
support networks to protect vital resources in the event
of a disaster. The third phase – response – comes into
play post-disaster, with the library focusing its efforts
on providing emergency aid to prevent further damage
to affected resources. Finally, in the recovery phase, the
library begins with support to restore minimal services
and then methodically works towards complete restora-
tion of normalcy through various planned interventions.
Together, these stages form a comprehensive approach
to disaster management, ensuring the safety and con-
tinued functionality of the library. The research team
developed a seven-part survey instrument grounded in
the DMC and informed by studies concerning libraries
in the Philippines and worldwide (Superio, Alayon and
Oliveros, 2019; Varlamoff and Plassard, 2004).
Detailed information about the survey instrument is
provided in the ‘Methodology’ section of this article.
This article primarily focuses on the preparedness phase, considering factors such as the library building’s location and structure, collection size, management support for equipment and training, and library personnel’s practices in disaster preparedness. It also highlights enabling and impeding factors for recovery, sharing lessons from previous disasters to clarify the current state of disaster preparedness among Philippine libraries.

Review of related literature

Introduction

Libraries, as essential parts of institutions, fulfill diverse roles, such as satisfying information needs, promoting learning, enhancing literacy and preserving collective memories (Cheong Choy, 2007; Hughes and Boss, 2021). Like most countries worldwide, there are four primary types of libraries in the Philippines: academic, school, public and special. According to Reitz (2013), academic libraries serve patrons within colleges, universities or other post-secondary educational institutions, whereas school libraries cater to those in elementary and secondary schools. In contrast, public libraries, which are government-funded, aim to meet the information needs of all residents within a community, district or geographical region. On the other hand, special libraries are designed to cater to the information needs of commercial firms, private associations, government agencies or non-profit organizations.

However, the library type in the Philippines does not determine its physical structure, the breadth of its collections and services, its budgetary allocations or the number of staff. These factors are more closely linked to the nature and resources of the parent organization. For instance, academic libraries in state-funded colleges and universities might have different resources than those in private educational settings. This variation can be seen in the number of collections they house, their budgetary allocations and their staffing, illustrating that the capabilities and resources of libraries are as varied as the institutions they serve.

Regardless of type, the value of the resources that libraries collect and the services they provide are vital. Therefore, like any other organizational unit, libraries must be preserved for the benefit of current and future generations. However, history records the tragic loss of countless libraries, both large and small, around the globe due to disasters (Polastron, 2007) – literature from ancient times to the present documents the damage inflicted on libraries by various disastrous events. Fires and floods are among the most common library disasters, often resulting from natural phenomena or human carelessness.

Moreover, war can also trigger fire- and water-related disasters (Superio, Abaday, Oliveros et al., 2019). The causes of war disasters can range from armed conflicts and civil unrest to political upheavals and acts of terrorism (Superio, Abaday, Oliveros et al., 2019; Van der Hoeven and Van Albada, 1996). Psychological warfare, a type of human-induced hazard, has led to the closure of libraries due to false statements, intended to sway constituents towards defunding public libraries. A drastic reduction in or the complete cessation of funding can inevitably shut down a library (Jensen, 2022; Koontz et al., 2009).

Given these risks, implementing a robust disaster preparedness and management programme is vital. Effective response measures must be in place to prevent irreversible harm to a library’s building, collections, staff and patrons during a disaster (Ahenkorah-Marfo and Borteye, 2010; Petersen, 2006). Various studies have assessed the disaster preparedness of libraries, illuminating both successes and failures in response strategies. The subsequent sections present studies documenting library disasters, focusing on global trends, South East Asia and the Philippines, as well as examining preparedness and management practices.

Disaster preparedness in libraries around the world

Disasters can strike any nation at any time. Despite being one of the most technologically advanced and cautious countries, Japan suffered enormous damage due to the Fukushima nuclear accident, the most severe nuclear disaster since Chernobyl in 1986 (McCurry, 2011). In addition to the devastating loss of human lives, livelihoods and infrastructures, numerous libraries and their collections were damaged, and some remained closed for years afterwards due to the high risk of exposure to radiation (Kobayashi, 2013; Suzuki and Miura, 2014). Given the complex and devastating nature of the Fukushima nuclear disaster, one might think that any level of disaster preparedness would be inadequate. However, the Japanese Red Cross Society’s prior training, preparation and implementation of lessons learned from the Kobe earthquake in 1995 enabled it to provide immediate emergency medical help. This was crucial because the local government had lost its response capability (Shiratsuchi, 2013). Similarly, despite the significant damage to their libraries, librarians managed to serve the affected community by lending library materials to victims at evacuation sites, thanks to their well-prepared disaster response strategy (Suzuki and Miura, 2014).

Mavodza (2022) identifies various risks faced by libraries in the Arabian Gulf region, including natural hazards like earthquakes, tsunamis, sandstorms, vermin...
and mould, as well as threats caused by humans, such as arson-induced wildfires, vandalism, theft and cyberattacks. Despite these persistent risks, libraries in the region remain ill-prepared to handle them. This lack of preparedness is also a common issue in other countries. For instance, Ayoung et al. (2016) found that libraries in Ghana are ill-equipped to withstand and avert disasters. Similarly, community libraries in South Africa’s North West Province seldom prioritize disaster preparedness, with librarians mistakenly believing that libraries are immune to disasters and that disaster preparedness is not their responsibility (Chizwina and Ngulube, 2021). Likewise, a disaster management plan is also absent among the majority of academic libraries in south-eastern Nigeria (Chiderah and Iroeze, 2021) and Sri Lanka (Wijayasundara, 2021). Although libraries are prepared to handle fire disasters and virus attacks in Nigeria, they are mostly unprepared for other types of disaster due to financial constraints (Ilo et al., 2018). This lack of disaster management policies and plans leads to librarians resorting to random and haphazard actions during disasters, which often worsens the condition of damaged resources (Ayoung et al., 2016).

Insufficient funding emerges as a critical factor hindering disaster preparedness and management efforts in academic libraries in Greece (Kostagiolas et al., 2011). A lack of financial resources also contributes to the absence of disaster management plans (DMPs) in museums in Turkey (Tosun and Bostan, 2022), as well as libraries in Nigeria (Ilo et al., 2018) and Ghana (Ayoung et al., 2016). Djalali et al. (2014) emphasize the importance of allocating financial resources to develop and maintain effective disaster preparedness and response programmes, which must be improved in many libraries worldwide. In contrast, the USA has institutionalized library support during disasters. American libraries are vital in providing health information and technology access during and after disasters, and are recognized as ‘first response’ entities. Consequently, the government funds disaster-stricken libraries to ensure continuity of operations through temporary relocation (Young, 2011).

**Disaster preparedness and management in libraries in the Philippines and other South East Asian countries**

Four South East Asian nations – namely, the Philippines (ranked first), Indonesia (ranked third), Myanmar (ranked sixth) and Vietnam (ranked twelfth) – have been identified as having a high disaster risk according to the 2022 WorldRiskIndex (Atwii et al., 2022). South East Asia is frequently affected by various natural hazards, including typhoons, floods, earthquakes and heatwaves (He et al., 2021). Over the years, these calamities have significantly disrupted the functioning of numerous libraries across several countries in the region. For example, in 2004, the provinces of Aceh and North Sumatra experienced a devastating tsunami caused by an underwater earthquake, which destroyed hundreds of academic institutions, including their libraries (Rachmananta, 2005). Moreover, the impact of this tsunami was felt in the libraries of neighbouring South East Asian countries, such as Thailand and Malaysia (Amarasiri, 2005).

Additionally, Malaysian libraries have suffered considerable damage from flooding, fire and landslides (Khalid and Dol, 2015). Besides such catastrophes, libraries in Myanmar (Bradley, 2017) and Vietnam (Lan, 2005) frequently face typhoon risks. Furthermore, libraries in the region are confronted with ongoing risks from human-induced hazards, such as theft, vandalism (Maidabino and Ngah, 2010; Rachman, 2020), arson, civil unrest, war (Superio, Abaday, Oliveros et al., 2019) and an unstable electric power supply, leading to potential computer hardware and software malfunctions (Rachman, 2020). In Myanmar, the existence of libraries is also threatened by government censorship (Bradley, 2017).

In the Philippines, water disasters due to typhoons and heavy rainfalls during the monsoon season have often been the cause of significant library disasters (Cabbuag and Pascua, 2019; Superio, Abaday, Oliveros et al., 2019; Superio, Alayon and Oliveros, 2019; Totanes, 2009) and remain constant threats (Abequibel and Caballero, 2019; Cabbuag and Pascua, 2019; Lagrama, 2012; Orenia and Cabonero, 2023). For example, the heavy flooding caused by Typhoon Ketsana damaged several libraries in Metro Manila, some of which sustained extensive damage, while the collection of one library was washed away (Totanes, 2009). Similarly, Super Typhoon Haiyan (known locally as Super Typhoon Yolanda) in 2013 affected numerous libraries in Panay Island (Superio, Alayon and Oliveros, 2019) and Eastern Visayas (Alayon et al., 2015), resulting in varying degrees of damage to the buildings and collections of these institutions.

Furthermore, certain libraries in the Philippines have suffered significant damage to their infrastructure and collections from other natural hazards, including tsunamis, earthquakes (Superio, Abaday, Oliveros et al., 2019) and lightning strikes (Superio and Alayon, 2014). Additionally, human-induced hazards like arson (Gallardo, 2016), civil unrest and terrorism (Superio, Abaday, Oliveros et al., 2019), along with preventable disasters such as plumbing malfunctions and leaks (Superio and Alayon, 2014),
have caused severe harm to libraries. These disasters continue to threaten the buildings and collections of libraries in the country (Abequibel and Caballero, 2019; Cabbuag and Pascua, 2019; Orenia and Cabonero, 2023).

Despite the regular occurrence of disasters that have devastated libraries in the Philippines and the rest of South East Asia, research indicates that disaster preparedness remains an uncommon practice, particularly concerning developing and maintaining DMPs. For instance, this issue is evident in academic libraries in Indonesia (Rachman, 2020), Malaysia (Khalid and Dol, 2015) and the Philippines (Abequibel and Caballero, 2019; Orenia and Cabonero, 2023; Superio, Abaday, Oliveros et al., 2019; Superio, Alayon and Oliveros, 2019), as well as the majority of libraries in Thailand (Sapphansaen, 2009). Although most of the libraries in the region have disaster preparedness equipment and practices that could help safeguard their collections in the event of a disaster, a crucial aspect remains absent – well-trained staff who are capable of responding to emergencies. This inadequacy is primarily attributed to the libraries’ limited budgetary allocations (Khalid and Dol, 2015; Rachman, 2020; Superio, Abaday, Oliveros et al., 2019).

Considering libraries’ critical role in preserving knowledge and supporting education, governments and relevant South East Asian authorities must address these risks and vulnerabilities. Implementing comprehensive disaster preparedness, mitigation strategies and measures to safeguard against human-induced hazards is crucial to ensuring the protection and continuity of these invaluable cultural and educational institutions in the region.

**Importance of disaster preparedness in libraries**

Disaster preparedness encompasses safety measures before, during and after an emergency (Adams et al., 2022; Petak, 1985). A vital component of disaster preparedness is the design and construction of libraries. Varlamoff (2005) argues that strategically locating libraries in lower-risk areas is the first step towards preservation and safety. Quality materials and proximity to emergency services are essential. Concrete or reinforced-steel buildings are more disaster-resistant than those constructed from unreinforced masonry or wood (Tetra Tech, 2013). However, many libraries have been built with substandard materials. In Nepal, several libraries were damaged during the 2015 Gorkha earthquake due to poorly engineered structures (Brando et al., 2015). Libraries in Montserrat with concrete roofs endured Hurricane Hugo in 1989 better than those with weaker roofs (Cassell, 2004).

In the Philippines, Typhoon Haiyan in 2013 wreaked havoc on libraries built with wood and concrete, causing extensive damage to their collections (Superio, Alayon and Oliveros, 2019). Although cheaper, there are more risks associated with wood, such as fire, typhoon and earthquake damage, and susceptibility to vermin (Superio, Alayon and Oliveros, 2019). Still, due to its lower cost, wood is often combined with concrete in the Philippines.

Another vital aspect of disaster preparedness is the creation of a functional DMP (Kaur, 2009; Khalid and Dol, 2015; Rachman, 2020; Superio, Alayon and Oliveros, 2019). Research reveals that many libraries, particularly in developing countries, lack a DMP, leaving them vulnerable to disasters (Abareh et al., 2021; Alegbeleye, 1990; Ayoung et al., 2016; Kaur, 2009; Khalid and Dol, 2015; Superio, Alayon and Oliveros, 2019). A functional DMP offers an organized approach to disaster response, reducing chaos (Soulen et al., 2020), while the absence of a DMP can lead to a failure to protect resources or even the failure of their survival (Khumalo and Nyirenda, 2017).

Adequately trained library staff are also crucial for disaster preparedness. Trained individuals can respond quickly, work diligently and apply the correct recovery procedures (Kahn, 2012). Conversely, untrained staff can cause further damage and even endanger lives (Chaudron, 2016; Labaka et al., 2013; Ryan, 2021). For instance, inadequate training led to ineffective recovery procedures during Typhoon Haiyan in the Philippines (Superio, Alayon and Oliveros, 2019), while well-trained American librarians have successfully implemented strategies during hurricanes (Bishop and Veil, 2013).

Lastly, the success of library disaster preparedness relies heavily on management support (Superio, Abaday, Oliveros et al., 2019; Superio, Alayon and Oliveros, 2019). Supportive management controls the necessary financial resources and personnel to establish a DMP and plays a crucial role in disaster recovery (Tweedale and Harrison, 1998). Libraries in various countries have failed in disaster preparedness due to inadequate management support (Abareh et al., 2021; Aburuki, 2016; Ayoung et al., 2016; Ilo et al., 2020; Kaur, 2009; Kostagiolas et al., 2011; Tosun and Bostan, 2022). Thus, the literature suggests that effective disaster preparedness depends on factors including robust library buildings, a functional DMP, well-trained staff and strong management support (Adams et al., 2022; Superio, Abaday, Oliveros et al., 2019).
Methods

This study employed a concurrent mixed-methods research design to explore disaster preparedness and management in libraries, using a seven-part survey instrument based on the DMC and existing research (Superio, Alayon and Oliveros, 2019; Varlamoff and Plassard, 2004). The instrument focused on the preparedness phase of the DMC (Alexander, 2002; Petak, 1985) and comprised the following components:

1. Parts 1 to 6 gathered quantitative data. These sections included the demographics of the respondents; the environmental, physical and financial profiles of the libraries; the profile of the library staff; disaster preparedness and management practices; disasters experienced in the last decade; and the extent of damage sustained by the library building and/or collections.

2. Part 7 consisted of open-ended questions aimed at providing insight into the realizations of and lessons learned by the librarians, mainly focusing on factors that enable or impede successful disaster response. The responses were categorized based on emergent themes identified in the collected data.

Data collection

Qualtrics, an online survey platform, facilitated the qualitative and quantitative data collection.

Sampling strategy and participants

The target population included head librarians or officers-in-charge from the 17 regions of the Philippines. A convenience sampling method was employed, primarily through posting a survey invitation with a link to the instrument on Facebook, the most used social media platform in the Philippines. Additionally, the posts were made public and designed to be shareable, and could be forwarded via the Facebook Messenger application, thereby facilitating snowball sampling. The invitation was also posted on the pages of regional librarian councils and various library associations.

Survey duration and response

The survey was conducted over three months, from March to May 2019. Out of the 102 responses received, only 90 were complete and considered valid for analysis. Although this represents a small fraction of the total libraries in the country, the results serve as a vital baseline for understanding the current state of disaster preparedness in Philippine libraries.

Ethical considerations

The participants were informed about the study’s purpose, the voluntary nature of their participation and the implied consent through completion of the survey. All of the responses were handled with the utmost confidentiality.

Data analysis

The quantitative and qualitative data gathered via Qualtrics was exported and subsequently cleaned in Microsoft Excel 2010. Furthermore, Excel 2010 facilitated the analysis of both data types. The quantitative data was analysed using frequency counts and percentages. For the qualitative data, thematic analysis was conducted to categorize the open-ended narratives into distinct themes. Each respondent was assigned a unique code – R01 to R90 – based on the order of the successful submission of their responses. For example, the first respondent to submit a valid response was given the code R01, the next respondent was labelled R02, and so forth. In this article, these codes have been utilized to reference the specific answers given by the respondents to the open-ended questions.

This methodological approach allowed the research team to develop a comprehensive understanding of the current state of disaster preparedness and management in libraries, integrating both statistical analysis and nuanced insights from librarians.

Limitations

The study has several limitations that should be considered when interpreting the results. First, although gathering quantitative and qualitative data simultaneously is acceptable in a concurrent mixed-methods design as it helps speed up the researcher’s data collection and save time (Bell et al., 2022), it has some drawbacks. In this study, the respondents had little to no opportunity – if any – to obtain clarification regarding any unclear items because the data collection tool was an online survey. Second, the respondents were conveniently sampled, which means that they may not fully represent the current state of libraries in the country. Third, the data collected was limited to specific provinces and covered only 90 libraries, representing a minimal percentage of the total libraries in the country. Fourth, the study did not gather information on the specific geographical areas of the libraries (e.g. upland or lowland, coastal or urban areas), which could have been essential in determining their exposure and vulnerability to hazards. Finally, it is important to note that the study
did not gather information regarding the intellectual, economic and psychological impacts of these disasters on the libraries and their librarians. Given these limitations, the researchers advise caution when generalizing the current state of disaster preparedness and management in libraries based solely on the descriptive statistics from the responses of these 90 libraries. Nevertheless, the study still makes a valuable contribution to the limited research on disasters in libraries in the Philippines.

Results
Profile of the libraries: location and type

Ninety valid responses were analysed, among which 82 (91%) were from head librarians and 8 (9%) were from librarians designated as officers-in-charge at the time of data collection. As shown in Figure 1a, among the 90 respondents, a significant proportion (38, 42%) were head librarians or officers-in-charge of libraries in the Mindanao region (the provinces of Agusan del Norte, Basilan, Bukidnon, North Cotabato, Davao del Norte, Davao del Sur, Davao Oriental, Lanao del Norte, Maguindanao, Misamis Occidental, Misamis Oriental, South Cotabato, Surigao del Norte, Surigao del Sur, Zamboanga del Norte, Zamboanga del Sur and Zamboanga Sibugay). In comparison, there was an equal number (26, 29%) of respondents from the Visayas (the provinces of Aklan, Antique, Capiz, Cebu, Leyte, Iloilo, Negros Occidental, Negros Oriental and Samar) and Luzon (the provinces of Albay, Benguet, Palawan, Pampanga, Quezon and National Capital Region) regions.

When grouped according to type of library (see Figure 1b), the majority (52, 58%) of the respondents were managers of academic libraries, while more than a quarter (24, 27%) were from school libraries. Additionally, a small number were from public (8, 9%) and special (6, 6%) libraries.

Table 1. Profile of the libraries (N = 90).

<table>
<thead>
<tr>
<th>Profile</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical structure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td>66</td>
<td>73.3</td>
</tr>
<tr>
<td>Mix of wood and concrete</td>
<td>24</td>
<td>26.7</td>
</tr>
<tr>
<td><strong>Number of library buildings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>66</td>
<td>73.3</td>
</tr>
<tr>
<td>2+</td>
<td>24</td>
<td>26.7</td>
</tr>
<tr>
<td><strong>Building(s) shared with other occupants</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>64</td>
<td>71.1</td>
</tr>
<tr>
<td>No</td>
<td>26</td>
<td>28.9</td>
</tr>
<tr>
<td><strong>Total volumes in library collection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 10,000</td>
<td>41</td>
<td>45.6</td>
</tr>
<tr>
<td>10,000–50,000</td>
<td>32</td>
<td>35.5</td>
</tr>
<tr>
<td>&gt; 50,000</td>
<td>17</td>
<td>18.9</td>
</tr>
<tr>
<td><strong>Annual budget (Philippine pesos)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 500,000</td>
<td>33</td>
<td>36.7</td>
</tr>
<tr>
<td>500,000–1,000,000</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>1,000,000–1,500,000</td>
<td>20</td>
<td>22.2</td>
</tr>
<tr>
<td>&gt; 1,500,000</td>
<td>19</td>
<td>21.1</td>
</tr>
<tr>
<td><strong>Distance from nearest body of water (metres)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 25</td>
<td>6</td>
<td>6.7</td>
</tr>
<tr>
<td>25–100</td>
<td>11</td>
<td>12.2</td>
</tr>
<tr>
<td>&gt; 100</td>
<td>24</td>
<td>26.7</td>
</tr>
<tr>
<td>In a city, far away from a body of water</td>
<td>49</td>
<td>54.4</td>
</tr>
</tbody>
</table>

Regarding library structure, Table 1 shows that almost three-quarters (66, 73.3%) of the libraries were...
constructed using concrete (see Figure 2a). In contrast, a little more than a quarter (24, 26.7\%\%) were made partly of wood and partly of concrete (see Figures 2c and 2d). Notably, the majority of the libraries were housed in one building (66, 73.3\%\%) that was shared with other offices (64, 71.1\%\%) within the institution (see Figure 2b).

While the majority (49, 54.4\%) of the libraries held more than 10,000 volumes of resources, a considerable proportion (41, 45.6\%) had a collection of less than 10,000 volumes. Regardless of their number, these resources need to be protected against any threat for the use of future generations. Meanwhile, the majority (51, 56.7\%) had an annual budget of 1 million Philippine pesos (approximately US$20,000) or less, whereas one-third (33, 36.7\%) had an annual budget of a maximum of only 500,000 Philippine pesos (approximately US$10,000). The corresponding budget needs to be increased, considering the increasing cost of books, equipment, supplies and maintenance.

Although the majority (49, 54.4\%) of the libraries were located in cities and were far enough away from a large body of water, a considerable number (17, 18.9\%) faced the constant threat of flooding. There were 11 (12.2\%) libraries that were situated between 25 and 100 metres away from the nearest body of water, and 6 (6.7\%) that were located less than 25 metres away. These bodies of water posed an impending threat to the libraries as they could cause flooding, considering that the Philippines is a tropical country where heavy rainfall is normal during the monsoon season and is regularly struck by typhoons.

**Profile of the library personnel**

Almost all of the libraries (84, 93.3\%) complied with the provision of the Philippine Librarianship Act of 2003 (RA 9246), stipulating that only registered librarians can practise librarianship in the country. Licensed professional librarians managed 93.3\% of the libraries (see Table 2). Moreover, as presented in Table 2, almost two-thirds (59, 65.5\%) of the library managers were educated to the level of at least a Master’s degree – the qualification required by the governing bodies and various library standards in the country.

Usually, the number of library personnel varies depending on the type of library. For instance, Table 2 shows that almost a third (29, 32.2\%) of the libraries had only one staff member, supporting the data on the

**Figure 2.** Physical structure of the libraries: (a) library constructed using concrete; (b) an office occupying a room in a library building; (c and d) library constructed partly from wood and partly from concrete.

Source: (a) Henry Luce III Library, Central Philippine University; (b) Donna May C Rivera, Central Philippine University; (c and d) Anne Ocular Animas, Negros Occidental National Agro-Industrial School of Home Industries.
number of respondents working in school libraries. However, it is also important to note that some school libraries in the country have more than one staff member. The majority (61, 67.8%) had at least two library personnel, of which 20 (22.2%) had at least 11 or more staff members; usually, this is the case in academic libraries where the number of librarians and staff is based on the number of students as determined by governing and accrediting agencies. Finally, only 54 (60%) of the libraries had staff trained in disaster preparedness and management, one of the essential factors in a successful library disaster preparedness and management programme.

Disaster preparedness and management

A DMP was uncommon among the majority of the libraries. Only 21 (23.3%) of the 90 libraries had a DMP. Moreover, based on the results of the qualitative data gathered, the DMPs of these 21 libraries dealt with the security and safety of the library personnel and clientele, library buildings and collections. All of the DMPs had been established at least a year before Typhoon Mangkhut (known locally as Super Typhoon Ompong) hit the Philippines in 2018. Specifically, 8 (38.1%) libraries had developed a DMP less than a year before Typhoon Mangkhut struck, while 10 (47.6%) had put a DMP in place one to five years prior. Finally, 3 (14.3%) libraries had been guided by a well-established DMP at least 10 years before Typhoon Mangkhut devastated the country.

Regarding the development of the DMPs, the administration helped craft the DMPs of the majority (17, 71.4%) of the 21 libraries. Typically, the DMPs of these libraries were included in or part of the institutional disaster risk reduction and management as a whole. On the other hand, a small number of the libraries had developed their DMP with the assistance of experienced librarians outside the organization (3, 14.3%) and experts (police officers, firefighters, etc.) commissioned by the institution (2, 9.3%).

To ensure that a library will be able to avoid the damage that a potential threat may cause, the regular updating of its DMP is essential. Only 11 (52.4%) of the 21 libraries with a DMP regularly updated their plan at least annually. Meanwhile, the remaining libraries (10, 47.6%) did not have a regular updating schedule or had yet to update their DMP since it was implemented or developed. Moreover, among the 69 libraries that did not have a DMP, only 49 (71%) expressed interest in formulating one.

As shown in Table 3, the lack of financial resources was the most common reason why a DMP was unavailable among 35 (50.7%) of the 69 libraries without a plan. Additionally, 28 (40.6%) identified the need for more knowledgeable human resources to implement a plan, and 26 (37.7%) noted the unavailability of a model DMP they could use as a guide in developing their plan. Moreover, a DMP was not available in these libraries because of a shortage of staff (18, 26%) and the absence of valuable collections, such as rare books (13, 18.8%). Finally, 9 (13%) respondents stated that they saw no possible risks.

Although a DMP was uncommon among a significant number of the libraries, most adopted disaster management practices (see Table 4) that could be useful in a disaster. The installation of emergency equipment such as fire and theft alarm systems (57, 63.3%) and the acquisition of emergency kits such as torches and fire extinguishers (53, 58.9%) were the most common practices. However, among the 57 libraries with alarm systems against fire and

### Table 2. Profile of the library personnel (N = 90).

<table>
<thead>
<tr>
<th>Profile</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of licensed librarians</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>6</td>
<td>6.7</td>
</tr>
<tr>
<td>1</td>
<td>43</td>
<td>47.8</td>
</tr>
<tr>
<td>2–5</td>
<td>26</td>
<td>28.9</td>
</tr>
<tr>
<td>6–10</td>
<td>7</td>
<td>7.8</td>
</tr>
<tr>
<td>&gt; 10</td>
<td>8</td>
<td>8.9</td>
</tr>
<tr>
<td>Highest educational qualification of head librarian/officer-in-charge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>31</td>
<td>34.4</td>
</tr>
<tr>
<td>Master’s degree</td>
<td>49</td>
<td>54.4</td>
</tr>
<tr>
<td>PhD</td>
<td>10</td>
<td>11.1</td>
</tr>
<tr>
<td>Number of library personnel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>29</td>
<td>32.2</td>
</tr>
<tr>
<td>2–5</td>
<td>27</td>
<td>30</td>
</tr>
<tr>
<td>6–10</td>
<td>14</td>
<td>15.6</td>
</tr>
<tr>
<td>11–20</td>
<td>11</td>
<td>12.2</td>
</tr>
<tr>
<td>&gt; 20</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Has a staff trained in disaster management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>54</td>
<td>60</td>
</tr>
<tr>
<td>No</td>
<td>36</td>
<td>40</td>
</tr>
</tbody>
</table>

### Table 3. Reasons for the absence of a DMP in the libraries (n = 69; multiple responses).

<table>
<thead>
<tr>
<th>Reason for lack of a DMP</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of financial resources</td>
<td>35</td>
<td>50.7</td>
</tr>
<tr>
<td>Lack of human resources</td>
<td>28</td>
<td>40.6</td>
</tr>
<tr>
<td>Lack of a model to serve as a guide</td>
<td>26</td>
<td>37.7</td>
</tr>
<tr>
<td>Unavailability of staff to write a DMP</td>
<td>18</td>
<td>26</td>
</tr>
<tr>
<td>No significant holdings of rare books</td>
<td>13</td>
<td>18.8</td>
</tr>
<tr>
<td>No perceived risk</td>
<td>9</td>
<td>13</td>
</tr>
</tbody>
</table>
Table 4. Disaster management practices in the libraries \((N = 90; \text{multiple responses})\).

<table>
<thead>
<tr>
<th>Disaster management practices</th>
<th>(n)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm system against fire and theft</td>
<td>57</td>
<td>63.3</td>
</tr>
<tr>
<td>Emergency kit (torches, fire extinguishers, etc.)</td>
<td>53</td>
<td>58.9</td>
</tr>
<tr>
<td>Library building is insured</td>
<td>40</td>
<td>44.4</td>
</tr>
<tr>
<td>Drills or exercises organized to train staff</td>
<td>41</td>
<td>45.6</td>
</tr>
<tr>
<td>Updated list of staff (telephone tree) to contact in an emergency</td>
<td>37</td>
<td>41.1</td>
</tr>
<tr>
<td>Staff trained regularly on library disaster management (at least once a year)</td>
<td>35</td>
<td>38.9</td>
</tr>
<tr>
<td>Contact with libraries/government agencies that could respond in case of a disaster</td>
<td>33</td>
<td>36.7</td>
</tr>
<tr>
<td>Staff responsible for disaster management</td>
<td>25</td>
<td>27.8</td>
</tr>
<tr>
<td>Collections are insured</td>
<td>23</td>
<td>25.6</td>
</tr>
<tr>
<td>Collections are labelled to identify what to prioritize in case of a disaster</td>
<td>20</td>
<td>22.2</td>
</tr>
<tr>
<td>Guidelines on how to save damaged library materials</td>
<td>16</td>
<td>17.8</td>
</tr>
</tbody>
</table>

theft, only 40 (70.8%) tested their systems regularly to see if they were functional.

Additionally, a considerable number of the libraries had conducted drills or exercises to prepare staff in case of an emergency (41, 45.6%), trained staff on library disaster management at least once a year (35, 38.9%), and established contact with other libraries and government agencies that could respond in case of an emergency (33, 36.7%). Furthermore, some libraries maintained an updated telephone tree (37, 41.1%) and identified staff who would lead the team (25, 27.8%) if there was a disaster.

At least 4 in every 10 respondents (40, 44.4%) had insured library buildings, while at least 2 in every 10 (23, 25.6%) had insured library collections. Also, to ensure that their most valuable collections were prioritized in an emergency, 20 (22.2%) labelled their collections. On the other hand, only a few (16, 17.8%) had established guidelines to ensure that damaged or affected library materials would be handled properly.

Disasters experienced in the last decade

Figure 3 reveals that in the past 10 years, 39 of the libraries have been affected by at least one disaster, such as a flood, earthquake, typhoon, fire, landslide or conflict. Of these libraries, 15 (38.5%) have experienced two or more disasters. The most frequent disasters caused by natural hazards, listed by 16 (41%) libraries, were earthquakes and flooding. In addition, some libraries have experienced typhoons (14, 35.9%), fires (9, 23.1%), war (i.e. the Battle of Marawi; 1, 2.6%) and a landslide (1, 2.6%), which could have impacted the library’s structure and collections.

As presented in Table 5, the disasters brought by floods (16, 100%), typhoons (13, 92.9%), fires (6, 66.7%) and earthquakes (10, 62.5%) caused at least a slight amount of damage to library buildings. While disasters caused by natural hazards such as floods, typhoons and earthquakes were found to have caused moderate to severe damage to a library’s structure, a fire (2, 22.2%), when not stopped as early as possible, could damage a whole library building. Similarly, typhoons (12, 85.7%), floods (13, 81.3%), fires (6, 66.7%) and earthquakes (10, 62.5%) were reported to have caused at least slight damage to the collections of the affected libraries (see Table 6).

Factors affecting disaster response

Finally, through open-ended questions, the respondents were asked to identify the enabling (see Figure 4a) and impeding (see Figure 4b) factors in their successful recovery of the damage caused by a disaster or disasters they had experienced in the past 10 years, and for those that were yet to come. A significant number pointed out that the quality of the library’s structure, design and location is one of the most critical enabling (16, 17.8%) or impeding (9, 10%) factors for adequate recovery. For example:

The strength of our library is that the building is built strongly and is located in a high area; thus, it is impossible or with a very slim percentage to experience a flood. (R73)

Our library collection is unsafe because parts of the building are made of light materials. (R31)

Additionally, the disaster management skills of the library staff (4, 4.4%), the library’s disaster management programme (4, 4.4%) and the availability of safety equipment (3, 3.3%) were found to have helped or can be helpful for successful recovery. For example, Respondent 37 commented: ‘The structure is made entirely of concrete materials, and the school has a disaster preparedness plan or programme’. Moreover, the value of a library network cannot be overestimated, as Respondent 90 pointed out: ‘Our partner libraries played significant roles in our speedy recovery. While we were busy managing and recovering some of the affected resources, our partner libraries allowed our students to use their collections’.

In contrast, the respondents identified that the lack of a DMP (9, 10%), trained library personnel (5, 5.6%), safety equipment (4, 4.4%), and insurance policies for
buildings and collections (3, 3.3%) had hindered their successful recovery. Finally, library personnel’s lack of knowledge and skills in handling affected library materials (5, 5.6%) and an unsupportive library management team (1, 1.1%) were also found to be factors in the inability of a library to recover successfully from a disaster. The following comments illustrate these findings:

Lack of experienced staff in disaster risk management. (R40)

The weakness is the irregular checking and monitoring of the clogged drainage and leaking water pipes near the library. (R27)

Our library is unprepared for any disaster as there is no disaster preparedness plan for the staff, building, and collections. (R33)

Our library is unprepared for any disaster due to an insufficient budget; hence, we cannot send staff for training on disaster management or purchase disaster equipment. (R30)
The DMC implies that during the disaster preparedness phase, a library should develop a response plan to address the existing risks, train staff to safeguard library patrons and collections, and establish a library network that can support it in a crisis. One way of determining the existing risks is to consider the quality of the library structure, the topology, the location of the library building, and the availability of emergency and essential services. According to Varlamoff (2005), these factors should be considered when constructing a library building to ensure safety.

The structural integrity of library buildings is a crucial factor in their ability to withstand disasters, safeguarding their collections, staff and patrons against catastrophic events. Similar to earlier research findings, most of the library buildings in this study were constructed with concrete materials (see Figure 2a). However, a considerable number were also constructed using a mix of concrete and wood (see Figures 2c and 2d), much like those in Western Visayas, Negros Oriental, Eastern Visayas and Marawi City (Abequibel and Caballero, 2019; Alayon et al., 2015; Superio, Abaday, Oliveros et al., 2019; Superio, Alayon and Oliveros, 2019). These libraries are thus more susceptible to damage from disasters caused by natural hazards (typhoons, floods, fires, earthquakes, vermin, etc.) and humans (arson, burglary, civil unrest, war, vandalism, etc.; Superio, Abaday, Oliveros et al., 2019). However, despite their vulnerability, many library buildings were constructed with lower-quality materials due to budget constraints (Najar and Wani, 2021; Superio, Abaday, Oliveros et al., 2019). Moreover, many libraries shared their space with other offices (see Figure 2b), potentially increasing disaster risk due to threats from the other occupants (Stringfield, 2000).

Several libraries were located near bodies of water, such as rivers and the sea, and at risk of flood and storm surges during typhoons or heavy rainfall.

### Table 6. Extent of damage sustained by the library buildings (n = 39; multiple responses).

<table>
<thead>
<tr>
<th>Disaster experienced</th>
<th>None</th>
<th>Slight (&lt;20%)</th>
<th>Moderate (20–50%)</th>
<th>Severe (&gt;50% but not totally destroyed)</th>
<th>Totally destroyed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthquake</td>
<td>6</td>
<td>37.5%</td>
<td>56.2%</td>
<td>6.2%</td>
<td>16</td>
<td>100</td>
</tr>
<tr>
<td>Flood</td>
<td>3</td>
<td>18.8%</td>
<td>31.2%</td>
<td>25%</td>
<td>16</td>
<td>100</td>
</tr>
<tr>
<td>Typhoon</td>
<td>2</td>
<td>14.3%</td>
<td>35.7%</td>
<td>28.6%</td>
<td>14</td>
<td>100</td>
</tr>
<tr>
<td>Fire</td>
<td>3</td>
<td>16.7%</td>
<td>33.3%</td>
<td>11.1%</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>Landslide</td>
<td>1</td>
<td>100%</td>
<td>22.2%</td>
<td>11.1%</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>War</td>
<td>1</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>1</td>
<td>100</td>
</tr>
</tbody>
</table>

### Figure 4. Enabling and impeding factors affecting a library’s success in disaster response and recovery.

#### Discussion

The DMC implies that during the disaster preparedness phase, a library should develop a response plan to address the existing risks, train staff to safeguard library patrons and collections, and establish a library network that can support it in a crisis. One way of determining the existing risks is to consider the quality of the library structure, the topology, the location of the library building, and the availability of emergency and essential services. According to Varlamoff (2005), these factors should be considered when constructing a library building to ensure safety.

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Several libraries were located near bodies of water, such as rivers and the sea, and at risk of flood and storm surges during typhoons or heavy rainfall.
Although the majority of the libraries were in cities and reported being distant from bodies of water, they were nonetheless more susceptible to disturbances such as noise, smoke, dust and vibrations caused by traffic, potentially creating a negative impact on their collections, visitors and staff (Najar and Wani, 2021). On a positive note, these libraries’ proximity to critical and emergency services could facilitate efficient disaster response (Najar and Wani, 2021).

Good management support is crucial for successfully implementing a library’s disaster preparedness and management programme, given that the management team controls staff’s time and budget allocations (Tweedale and Harrison, 1998). A library’s budget significantly determines its success, influencing various aspects such as system development, collection development, and disaster preparedness and management. Najar and Wani (2021) argue that sufficient funding is necessary for libraries to devise and carry out an effective disaster preparedness and management programme. However, contrary to this assertion, most of the libraries in this study were underfunded, with the majority operating on a budget of around 1 million Philippine pesos (approximately US$20,000). A substantial number operated with less than half this budget. Most libraries’ budgets sufficed only for collection development and other operational costs, which deprioritized the acquisition of disaster equipment and staff training in disaster preparedness and management. Safety equipment and personnel training are crucial to preparing libraries for potential threats (Ilo et al., 2018). They can significantly enhance library security (Akor, 2013) and ensure the correct implementation of a DMP (Kaur, 2009).

Consequently, these underfunded libraries are likely to suffer more damage when disasters strike due to their limited budget allocations and unfortunate location in disaster-prone areas, making them vulnerable at all times. This limited funding has similarly impacted the disaster preparedness and management programmes of libraries in Negros Oriental (Abequibel and Caballero, 2019), Panay Island (Superio, Alayon and Oliveros, 2019), Marawi City (Superio, Abaday, Oliveros et al., 2019) and even Ghana (Ayoung et al., 2016), India (Kaur, 2009) and South Africa (Ngulube and Magazi, 2006).

Although licensed professional librarians managed most of the libraries, a significant number were still managed by non-librarians. This result is surprising, given that the Philippine Librarianship Act of 2003 (RA 9246), which came into force two decades ago, stipulates that only registered librarians are permitted to practise librarianship in the country. Furthermore, the Commission on Higher Education stipulates that head librarians should possess a Master’s degree in Library and Information Studies, emphasizing the importance of qualified library managers for successful library programmes and activities. Regrettably, several libraries remain non-compliant, as their managers lack Master’s degrees. On a positive note, there has been an increase in both licensed librarians and those with Master’s degrees managing libraries compared to previous studies in Western Visayas (Superio, Alayon and Oliveros, 2019) and Marawi City (Superio, Abaday, Oliveros et al., 2019). In line with this, Superio, Abaday, Oliveros et al. (2019) note that disaster management is incorporated into some Master’s degree programmes in Library Science in the Philippines, thus offering an added advantage to qualified library managers.

Furthermore, disaster preparedness and management training for library personnel is integral to implementing a disaster management programme (Doig, 1997; Eden and Matthews, 1996; Kaur, 2009; Kostagiolas et al., 2011). Such training equips library personnel with the knowledge and skills to respond effectively to disasters (Wijayasundara, 2021), limiting potential damage (Kahn, 2012). However, there remained a dearth of staff with adequate training in many of the libraries, leading to increased vulnerability for most of the libraries and their collections. This result substantiates the findings of Superio, Alayon and Oliveros (2019) and Superio, Abaday, Oliveros et al. (2019) regarding the state of the libraries in Western Visayas and Marawi City, respectively. Moreover, Chaudron (2016) notes that a lack of training might lead library personnel to respond to a disaster in a poorly thought-out manner, which could endanger their own lives, like the staff did during the flooding incidence at the McWherter Library, USA, in 1996. According to Robertson (2014), libraries do not prioritize training because they depend on first responders or law enforcement officers to manage the situation if a disaster strikes.

DMPs are indispensable tools for libraries. The routine testing and revision of these plans can equip libraries to handle disasters, alleviate panic among staff, and ensure that appropriate measures are undertaken to protect library resources, personnel and patrons (Morgan and Smith, 1997). However, despite their considerable value, the implementation of DMPs remained infrequent among the libraries. The results of this study are consistent with previous research conducted within the country (Abequibel and
Caballero, 2019; Superio, Abaday, Oliveros et al., 2019; Superio, Alayon and Oliveros, 2019) and also align with studies on libraries and museums in other parts of the world (Ayoung et al., 2016; Chiderah and Iroeze, 2021; Kaur, 2009; Kostagiolas et al., 2011; Nongrang and Khongtim, 2021; Tosun and Bostan, 2022).

In addition, our findings parallel those of Superio, Alayon and Oliveros (2019) and Superio, Abaday, Oliveros et al. (2019), who studied academic libraries in Western Visayas and Marawi City, respectively, and Garnett et al. (2018), who examined academic libraries in Australia. Across these studies, limited financial resources were identified as the primary reason for the absence of DMPs in libraries. Other reasons acknowledged by some libraries include a shortage of staff, the need for a guide to serve as a reference for creating a plan, and the absence of valuable collections like rare books and perceived risks.

Despite the absence of a DMP, libraries often adopt practices (Ngulube and Magazi, 2006; Superio, Abaday, Oliveros et al., 2019; Superio, Alayon and Oliveros, 2019) and mitigation actions (Rasaki, 2019) that are designed to reduce risk and enhance preparedness for potential disasters (Eden and Matthews, 1996). Consequently, several libraries had implemented at least three disaster management practices, including installing emergency alarm systems for fire and theft, making emergency kits available equipped with torches and fire extinguishers, providing an up-to-date phone book, and having designated personnel who are trained to take control in a disaster scenario. In addition, some libraries had instituted guidelines for handling damaged collections to minimize further damage and facilitate restoration. Interestingly, although it was not widespread, certain libraries had taken the prudent step of securing insurance cover for their physical infrastructure and collections. Such cover could provide crucial financial protection for libraries in the case of a catastrophe (Abareh, 2014; Ungarelli, 1984).

The geographical location of the Philippines makes it prone to various natural hazards, such as typhoons and earthquakes. These events often lead to associated water-related calamities, including floods, landslides and tsunamis, particularly in regions characterized by heightened vulnerability coupled with limited adaptive and mitigative capacities, thereby limiting their capacity to address the resulting consequences effectively. Moreover, human-induced disasters such as war, civil unrest and arson have affected various regions across the country. Numerous studies have documented the impacts of these events and the resultant damage inflicted on libraries in different parts of the nation (Abequibel and Caballero, 2019; Alayon et al., 2015; Superio, Abaday, Oliveros et al., 2019; Superio, Alayon and Oliveros, 2019). According to the findings of our study, nearly 40% of the libraries surveyed had experienced flooding, earthquakes, typhoons, fires, landslides or conflicts at least once in the preceding decade. These disasters resulted in minimal damage to the libraries and their collections. Flooding, typhoons and earthquakes typically cause moderate damage, whereas fires often result in total destruction. Identifying the kinds of disasters previously faced is essential for libraries. This understanding can inform preventive measures and shape future strategies, ensuring robust preparation and effective disaster management (Rachman, 2020).

Finally, the respondents identified the factors that allowed and prevented them from successful disaster recovery. They identified the quality of a library’s structure as the key determining factor for a library to withstand a disaster. Additionally, similarly to the librarians from Western Visayas (Superio, Alayon and Oliveros, 2019) and Marawi City (Superio, Abaday, Oliveros et al., 2019), the respondents highlighted skilled library personnel, a disaster management programme, the availability of safety equipment and library networks as critical contributors to successful disaster recovery. Conversely, the absence of these factors was commonly cited as why some libraries could not respond effectively and recover efficiently.

Conclusions and recommendations
The importance of disaster preparedness and management in library settings cannot be overstated. It may help avoid or minimize damage to a library building and the library’s invaluable collections, and provide vital guidelines for personnel during disaster response and recovery. The findings of this study confirm a constant threat to libraries in the Philippines stemming from calamities brought about by both natural hazards and human-induced disasters. Regrettably, some libraries are never prepared to face a disaster effectively. This unpreparedness is glaringly obvious in their poor structure, insufficient budget, and unqualified and untrained staff in disaster preparedness and management. Additionally, the absence of a DMP is a common shortcoming.

Moreover, libraries need librarians with disaster preparedness and recovery knowledge and skills. Libraries with well-trained personnel stand a much better chance when a disaster strikes. Therefore, all libraries nationwide must ensure the availability of
trained staff – a critical factor in successfully implementing a DMP. A DMP is only as effective as the knowledgeable staff operating its procedures and protocols. In order to address all facets of disaster preparedness, including prevention, planning, response and recovery, training in creating a DMP is also suggested. Additionally, considering the potential for human-induced hazards, education for library users on the correct and safe use of library resources, equipment and supplies is fundamental to protecting libraries’ infrastructure and collections.

In light of the study’s findings, it is imperative for the country’s governing bodies, specifically the Commission on Higher Education and the Professional Regulation Commission Board for Librarians, to ensure that every librarian possesses substantial knowledge of disaster preparedness and management. As a strategic response, it is strongly recommended that a specialized course focusing on library disaster preparedness and management be integrated into the curriculum of the Bachelor’s degree programme in Library and Information Studies. This approach is supported by Singh and Shukla (2021), who assert that acquiring knowledge of disaster management during their academic training enables librarians to address disaster-related challenges more effectively within their regular professional roles and responsibilities.

Moreover, to cultivate a culture of effective management within libraries, it is advisable that the Commission on Higher Education and prominent accrediting agencies in the nation – such as the Philippine Accrediting Association of Schools, Colleges and Universities, the Philippine Association of Colleges and Universities Commission on Accreditation, and the Association of Christian Schools, Colleges and Universities Accrediting Association – mandate both academic and school libraries not only to formulate but also to implement a comprehensive disaster preparedness and management programme. This requirement should be fulfilled prior to the conferral of accredited status, thus ensuring a robust and proactive approach to handling potential disasters and their impacts.

Considering the vital role that peer networks play in professional development, including education, the adoption of innovations and sharing practical ideas, library associations nationwide must focus on integrating disaster preparedness and management into their regular training and activities. Organizations such as the Philippine Librarians Association, Association of Special Libraries of the Philippines and Philippine Association of Academic/Research Librarians play an essential role in ensuring that librarians remain up to date and competent in this crucial area of library operations. Recognizing the significance of disaster preparedness and management is only the initial step towards establishing a robust library system in the country. Continuing education for librarians, alongside improving disaster management programmes, is essential for better library disaster prevention, preparation, response and recovery.

Considering the significant roles played by local government units in fostering disaster-resilient communities, as indicated in RA 10121 and the National Disaster Risk Reduction and Management Plan, it is recommended that disaster managers or the local disaster risk reduction and management officers of local government units provide comprehensive training to libraries within their jurisdiction. Moreover, to facilitate the creation of DMPs, protocols between libraries, the Commission on Higher Education, the Department of Education, and local disaster risk reduction and management offices should be established. Additionally, given the absence of explicit provisions in the implementation of the National Heritage Act of 2009 (RA 10066) on how the government should prioritize the protection of national cultural properties, an update of this law will be essential to ensure their adequate safeguarding and preservation.

Given the constant threats posed by disasters triggered by natural or man-made hazards to libraries worldwide, this study’s findings are likely to benefit all libraries, irrespective of their size or location. By adopting a more comprehensive and proactive approach, libraries can enhance their disaster preparedness, thereby safeguarding their collections and infrastructure, and the communities they serve. This study not only highlights gaps in current practices but also offers a road map for establishing a more resilient and prepared global library network that is equipped to face the challenges of an increasingly unpredictable world.

Considering the limited number of respondents and the generalization of the results regardless of the type of library, a comprehensive national survey addressing unexplored factors like differences in library operations, funding and collections is suggested for future research. Inferential research may also provide additional insights into the variables influencing variations in disaster preparedness and management, thereby addressing the current research gaps in disaster preparedness and management among libraries in the Philippines. Finally, given the lack of extensive research on library disaster preparedness and management in South East Asia and globally, a similar comprehensive study is highly recommended. This approach would enrich the existing body of
knowledge and contribute significantly to developing more resilient libraries worldwide.

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Research data management in selected East African libraries: A survey

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Abstract
This article investigates the knowledge of research data management and services among library professionals in selected East African libraries. A survey research design was employed, and data was collected using a structured questionnaire from 180 respondents representing four East African countries: Malawi, Mozambique, Zambia and Zimbabwe. The findings reveal that only 31.1% of the selected East African librarians agreed that their institutional libraries provided research data management services. The standard research data management services offered by their libraries included data publishing, sharing and reuse, while collaboration with academic programmes was identified as an essential approach for research data management skill development. The study highlights the need for librarians to acquire legal, policy and advisory skills and knowledge of institutional and extra-institutional resources and the research life cycle for effective research data management service delivery.

Keywords
Research data management skills, research data management, research data services, East African libraries, academic libraries, African librarians

Introduction
The global research landscape has undergone significant transformations with the adoption of information and communications technologies (ICTs). This shift has profoundly impacted the library and information sector, leading to a transition from traditional library services to electronic and ICT-based offerings. Researchers and information users now encounter new phenomena, such as open access and open science, predatory publishing, stricter requirements from research funders and the handling of large data volumes (Atiso et al., 2019; Hrynaszkiewicz et al., 2020; Wilson et al., 2020). These developments have introduced new research terminologies, such as Research 2.0 and eScience. Within this evolving landscape, research data management (RDM) has emerged as a critical aspect of modern research (Koltay, 2020).

RDM encompasses a range of activities aimed at organising, storing, preserving and disseminating research data throughout its life cycle. Librarians, with their expertise in managing digital scholarly literature, possess relevant skills that can be applied to data curation, preservation and facilitating access. As research data gains increasing importance, universities and academic libraries are prioritising RDM initiatives to effectively support researchers (Chawinga and Zinn, 2020; Howie and Kara, 2022; Kalusopa et al., 2020; Semeler et al., 2019).

RDM ensures that data is appropriately organised, preserved and made accessible to meet the needs of data users and add value to society. Research data encompasses various types of information generated...
or acquired during the research process, including text, spreadsheets, questionnaires, photographs, films, test responses, slides, laboratory notes, statistics, observations, experimental results, measurements, samples, algorithms, scripts and workflows (Elsayed and Saleh, 2018; Syn and Kim, 2022).

With the introduction of RDM projects in universities, university administrations have recognised the need to prioritise data management to support researchers fully (Price, 2018). Similarly, the Society of College, National and University Libraries reported that academic libraries are shifting from traditional collections to services that align with the changing landscape of research, teaching and learning (Pinfield et al., 2017).

Librarians possess versatile skills, which they have accumulated and applied to managing digital scholarly literature. Therefore, it is argued that these skills are relevant and transferable to handling research data, including data curation, preservation and facilitating access (Anyaoku et al., 2018; Chawinga and Zinn, 2020; Cox et al., 2019; Federer et al., 2020; Howie and Kara, 2022). Cox et al. (2019) provide examples of relevant traditional library skills that can be applied in the RDM context, including advisory and support services, data advisory services, information literacy, data literacy, management of data repositories and metadata management.

The knowledge of these skills is essential for African librarians to provide effective RDM services to their respective communities. The literature has shown an increasing demand from scholars for supporting data to be included in their research (Chawinga and Zinn, 2020; Hrynaszkiewicz et al., 2020; Jones et al., 2019). Additionally, grant organisations now require that the data from their recipients be made available for funding purposes, and there have been campaigns led by data champions to lift embargoes on data access (Anyaoku et al., 2018; Wilson et al., 2020). Given these developments, librarians are encouraged to acquire RDM skills to meet the increasing user demands in their respective libraries.

In East Africa, universities are actively engaged in various research activities. More literature about RDM in East African libraries is needed, with further investigation into the role of librarians in RDM in the region. This study aims to reveal the level of RDM awareness and implementation in the region by examining the skills possessed by librarians. The underutilisation of RDM services could lead to a failure to harness the benefits of effective data management. RDM has become integral to librarianship and its practical application has created numerous opportunities. Therefore, this study is crucial in understanding the level of RDM knowledge among East African professionals and how this knowledge can be used to enhance service delivery.

Objectives of the study

This study aims to investigate the state of RDM in selected East African libraries. The objective is to survey and analyse the RDM services offered by these libraries; assess the frequency and types of services provided; identify areas for improvement and skill development needs; and explore the approaches libraries use to enhance their staff’s RDM expertise. The study includes the following research questions:

1. Do the libraries currently provide RDM services?
2. How frequently are RDM services offered in the libraries?
3. What specific RDM services are available in the surveyed libraries?
4. What are the skill development needs of library staff concerning RDM?
5. What are the essential skills and competencies required to provide effective RDM services?
6. What approaches do libraries adopt to develop their users’ RDM skills?

Literature review

Research data forms the basis of any scholarly investigation, and it is commonly recognised that research plays a crucial role in expanding scientific knowledge. Research is of the utmost importance, but research data appears to receive less attention and be accorded less value. According to Si et al. (2013), RDM is a crucial component of distributing research data sets and a major factor in academic libraries’ open data publication and curation services. RDM is the complete care and handling of research data, including tasks like making the data easier to access, preserving it and adding value to it over time. It is essential for improving the discoverability, accessibility and impact of research. It also adds to the collaborative, computational and data-intensive character of modern science investigations (Tenopir et al., 2020).

Research and academic institutions are investing in systems to manage the growing volume of research data in response to the changing scientific research landscape, which is characterised by greater collaboration, data intensity and worldwide outputs. This transformation is facilitated by cyber infrastructures and data-sharing rules from funding agencies that support open science principles. RDM services are multidimensional; they go beyond data curation and
include open publication, open access advocacy and transparent research practices (Tammaro and Casarosa, 2014). The introduction of novel technologies has led to an explosion in digital data and study objects, presenting opportunities and difficulties for data management and collecting (Kruse and Thesstrup, 2014).

There has been a global push for more data sharing, especially in biomedical research, emphasising open data as a less restrictive type of data sharing. Nonetheless, issues continue, especially in low- and middle-income countries in the Global South’s member regions of Africa, Latin America, and parts of Asia and the Middle East. Most of the Global South is still in the early stages of RDM implementation. Bhoi et al. (2023) surveyed leading colleges and universities in India and found that RDM services in the top Indian colleges and universities are still in their early stages, affirming the low level of RDM adaptation in the Global South. According to Mavodza (2022), despite the emergence of local RDM operations, little is known about their significance. As a result, leveraging current awareness to organise practical RDM activities can aid in the retrieval and availability of data that is relevant to the region. Chiware (2020) further discovered that open science in Africa is still in an early phase due to the funding and technical problems confronting research facilities. Hence, data management services are in their infancy, with reports of success in a few nations where open scientific and RDM policies have been formed, cyber and data infrastructures are being built, and limited data librarianship courses are offered.

Machimbidza et al. (2022) discovered that certain learning institutions in Zimbabwe were failing to meet the current TELOS (technological, economic, legal, organisational, scheduling) model because they lacked a robust technological system to support data creation, data collection and description, data storage, archiving and preservation, data access, data discovery and analysis, and data reuse and transformation. However, despite a lack of institutional capacity and policies regarding research data, libraries are deploying these new services, albeit unevenly in terms of both the number of services and the type of support provided (Martin-Melon et al., 2023).

Libraries are central to this data management evolution because of their significant role in research and scholarly publication. Therefore, acknowledging their growing importance in RDM, librarians play a crucial part in implementing data management services. They engage in capacity building, community involvement and awareness building to improve research and data sharing (Serwadda et al., 2018). There is no shortage of opportunities for librarians to actively promote RDM and curation as part of the open scientific movement. Librarians have continually exhibited flexibility and readiness to embrace change. This approach has played a significant role in early successes, as witnessed in recent UK studies which document that librarians’ function in RDM emphasises the importance of prioritising data curation when building libraries and information centres (Davidson, 2016: Howie and Kara, 2022). Because they are skilled at adjusting to new technology, librarians are well positioned to be essential players in the evolving RDM scene. To help researchers throughout the data life cycle, it is seen to be crucial to provide librarians with fundamental RDM abilities, such as data planning, sharing, documenting and preservation (Ahmad et al., 2019; Chawinga and Zinn, 2020; Federer et al., 2020). Research has shown that librarians and libraries may offer various useful data services, from planning to research data services (Surkis and Read, 2015; Tenopir et al., 2020).

Nevertheless, there are still issues with RDM adoption and implementation, even as its significance is becoming more widely acknowledged. Although RDM is becoming increasingly important in academic libraries, there are differences in its application across developed and developing nations (Ashiq et al., 2022). Acknowledging RDM systems in higher learning institutions brings to light numerous issues in developed and developing nations. Studies have revealed obstacles that require greater attention and cooperation, such as institutional commitment, faculty participation, inadequate competence among library staff and lack of institutional support (Cox and Pinfield, 2014; Tenopir et al., 2020). Therefore, to stay relevant in the changing RDM environment, librarians are urged to acquire new skills and a deeper comprehension of the research life cycle (MacMillan, 2015). According to Ntja (2022), libraries offer data management planning assistance, data storage and management, and guidance and training in support of RDM, indicating a strong need for libraries to build capacity through the development of staff skills to deal with the challenge of librarians’ workloads and attitudes, and researchers’ reluctance to engage with RDM and institutional partnerships. Emphasizing the importance of widely accepted training criteria, including active participation during training, demand for RDM training, increased participant knowledge and grasp of RDM, confidence in implementing RDM practices, and soliciting and incorporating good post-training feedback is crucial for effective implementation and enhancement of RDM initiatives within library settings. A study by Rantasaari (2022) found
that by achieving competency and awareness of RDM and its contents, as well as obtaining the necessary tools and skills to use sound RDM practices in their research library, library professionals had a significant impact on the success of academic and research professionals. This impact was evident in efficient research data management and in fostering a collaborative environment that facilitated the seamless integration of RDM principles into academic and research endeavours, ultimately contributing to the overall advancement and quality of scholarly output.

In a study conducted by Badenhorst and Raju (2023), it was identified that academic librarians require a set of essential skills to proficiently deliver Research Data Management (RDM) services to their research communities. These key abilities encompass expertise in information and data management practices, familiarity with data centers, repositories, and collections, proficiency in data curation, effective management of data collection, a comprehensive understanding of funder policies, and adaptability in research methods and procedures. The study also identified the prominent skill sets necessary for RDM services, which include ICT abilities, digitisation skills, and the ability to prepare data sets for deposit. The survey found that the most important personal traits (or ‘other competencies’) are flexibility, adaptability, digital savviness and a continuous willingness to learn. The study found that library and information science professionals interested in RDM are not expected to possess all these essential competencies. Consequently, collaboration among library and information science experts engaged in RDM becomes vital for delivering efficient RDM services to research communities, leveraging both existing abilities and opportunities for future learning. However, Behrens and Blask (2023) argue that focusing on the basic RDM competencies of data curation differs significantly from the RDM competencies of appropriately managing research processes. In this respect, it is noteworthy that training and continuing education for researchers on RDM themes has expanded significantly in recent years. On the other hand, training in curation-specific RDM competencies is still in its early stages and constitutes a significant gap in the development of data literacy.

Furthermore, because of the data ecosystem, faculty members must participate in the data management process. For reproducible and transparent science, good RDM is required. However, Leimer et al. (2023) found that researchers are frequently unfamiliar with handling research data, publication possibilities, legal considerations and accessible software tools. According to a study by Xu et al. (2022), social science graduate students who received online RDM teaching scored much higher in RDM knowledge than students in the control group.

A study conducted by Leonard et al. (2023) revealed that the transition to new services has led to a limited integration of librarians into the research process in academic and research libraries. Consequently, new positions in librarianship, including roles such as digital curator, research data librarian, scholarly communications librarian, and research librarian, have been introduced in academic and research libraries across Africa. Masenya (2021) goes on to say that academic libraries are struggling to manage their research data due to a lack of established policies and standards, inadequate standardised storage infrastructure, time constraints on organising data, limited funding, insufficient resources, a lack of skills and training in managing research data, and a lack of incentives for researchers to share their data.

Farinelli and Zigoni (2022), in their analysis of the adoption of current research information systems for RDM, found that current research information systems play a key role in facilitating the management and reporting of an institution’s research activities and outputs. Not only do they offer extensive functionality for researchers and research administrators to manage all aspects of their research information effectively, but they are also integrating more and more with specialised RDM tools, institutional repositories and other external systems.

The literature shows that a multifaceted strategy is needed to address these issues, including faculty involvement, awareness-raising marketing, the creation of data management infrastructure and research data service policies. This is because effective RDM practices are impeded at several higher education institutions by the lack of strong policies, infrastructure and management support (Chigwada et al., 2017; Chiware and Becker, 2018). Furthermore, studies show that to overcome the current obstacles, more RDM policies, better infrastructure and more managerial assistance are required (Buhomoli and Muneja, 2021; Hamad et al., 2021), as well as the formulation of a data management plan (Fadlelmola et al., 2021). A study by Donner (2023) reveals that the implementation of an RDM system is strongly impacted by the organisational structure, infrastructure and labour culture as strategic considerations.

The literature on RDM is scarce in the East African setting, necessitating a complete study to understand the implementation, problems and methods connected with RDM in East African libraries. Such an examination is critical for creating a vibrant regional research ecosystem and addressing East African libraries’ unique issues in efficiently handling research data.
Methodology

This study utilised a quantitative research method, employing a survey-based approach to gather data from academic libraries across four African countries. A closed-ended questionnaire was meticulously developed to capture the diverse dimensions of RDM practices, services and skill development needs. The questionnaire was distributed using Google Forms through various platforms, including Web 2.0 channels and direct emails collected from institutional directories and library websites.

Questionnaire development and validation

The questionnaire was structured to facilitate quantitative analysis, emphasising clarity, conciseness and relevance. Accomplished RDM experts and academicians critically assessed the questionnaire for clarity, relevance and comprehensiveness, contributing valuable feedback. A small group of potential participants carried out a pilot study. Feedback gathered was instrumental in refining the questionnaire for accuracy and meaningful responses.

Selection of participants

The study focused on academic librarians and information scientists from four East African countries – Malawi, Mozambique, Zambia and Zimbabwe – that were chosen to represent diverse RDM practices. One hundred and eighty respondents were selected using simple random sampling, balancing statistical significance with the feasibility of data collection. Thirty-seven (20.6%) of the participants were from Malawi; 8 (4.4%) were from Mozambique; 76 (42.2%) were from Zambia; and 59 (32.8%) were from Zimbabwe.

Data collection

The structured questionnaire comprised three sections covering demographic information, the availability of RDM services, and librarians’ RDM skill development needs. The data was collected over three months (July to September 2022) to encourage engagement and ensure diverse responses.

Data analysis

Utilising the Statistical Package for the Social Sciences (SPSS), quantitative methods such as frequency analysis, percentage calculation, and mean and standard deviation were applied to extract meaningful insights from the data collected.

Ethical considerations

This research obtained prior ethical clearance from relevant institutions, adhering to established protocols for studies involving human subjects. Formal permissions were acquired from the respective academic institutions before data collection, ensuring compliance with their guidelines. The participants were fully informed about the study’s purpose and procedures, providing explicit consent voluntarily. To safeguard confidentiality, no personally identifiable information was associated with the collected responses during analysis, preserving participant anonymity. Stringent data-handling protocols were implemented, restricting access to authorised personnel to maintain data confidentiality. Throughout the study, strict adherence to the ethical guidelines and regulations set by institutional review boards was maintained, ensuring the protection of the participants’ rights and welfare.

Results and discussion

Figure 1 illustrates the frequency and percentage distribution of gender among the respondents. Of the 180 participants, 63.3% were male and 36.7% were female.

In Figure 2, the data presents the availability of RDM services at East African universities. Of the respondents, 56 individuals (31.1%) reported that RDM services were available, while 124 individuals (68.9%) indicated that such services were not available. This data suggests that a significant number of the surveyed institutes and universities currently need to provide RDM services, highlighting an area for improvement in supporting RDM needs.

As shown in Figure 3, the frequency of use of RDM services reveals a predominant lack of implementation, with 68.9% reporting no usage. A small proportion (5.5%) used RDM services a couple of times a year, while 8.9% employed them monthly. Weekly usage was reported by 11.7% of the participants, and 5% said they used such services on a daily basis. This data showcases that there is a significant majority of institutions and universities without RDM services, indicating low integration. However, a minority of the participants demonstrated regular use, with some employing RDM services weekly or daily. This disparity underscores the respondents’ diverse adoption levels and usage patterns, indicating room for increased RDM implementation across the surveyed population.

Table 1 presents the data analysis of the libraries’ RDM services. The table reflects the availability and frequency of various RDM services offered by the libraries based on a sample of 180 participants. The most commonly provided RDM service is ‘data publishing, sharing and reuse’, which includes assistance...
with intellectual property matters and metadata, accounting for 27.2% of the responses. The second most prevalent service is ‘carrying out long-term preservation of research data’ through data or institutional repositories, accounting for 26.7%. Additionally, the librarians emphasised ‘supporting reproducibility, transparency in workflows and research integrity’, which accounted for 25.6% of the responses. The libraries also offer ‘data management training or data literacy instruction’ for research students and early career researchers, with 20% of the respondents benefitting from this service.

Furthermore, libraries in East Africa provide ‘analysis and visualisation of data sets’ using various software tools, including Python scripts, SPSS, R and Microsoft Excel, which accounted for 17.2% of the responses. Another service in this domain is ‘study and analysis of data (instructional support)’, with the
same percentage. In addition, 13.3% of the participants had libraries that offered ‘advisory services on data analysis, mining and visualisation’. The libraries also play a role in ‘promoting awareness of reusable data sources, such as data archives’, benefiting 10% of the respondents. Lastly, a few libraries maintain ‘a web resource/guide of local advice and valuable resources for RDM’, catering to 4.4% of the participants.

Table 1 reveals that the libraries offer a diverse range of RDM services. While data publishing, preservation and support for reproducibility are prominent areas of focus, data analysis, training and advisory services are also essential components of their RDM offerings. The libraries’ commitment to promoting data literacy and accessibility is evident through providing valuable resources and advice on RDM.

Table 2 summarises the RDM skill development needs for the libraries, and includes the mean (M) and standard deviation (SD) values for each skill. ‘Legal, policy and advisory skills’ had the highest mean (M = 4.33, SD = 0.9), indicating their significant importance, closely followed by ‘knowledge of institutional and external resources’ (M = 4.23, SD = 0.9). ‘Knowledge of RDM principles, technologies and metadata’ ranked third (M = 4.18, SD = 0.92). ‘Knowledge of the research life cycle’ received a mean rating of 4.01 (SD = 1.09). ‘Data curation and metadata skills’ and ‘technical and ICT skills’ had mean ratings of 3.95 (SD = 1.04) and 3.93 (SD = 1.07), respectively. ‘Knowledge of researchers’ needs...
and available resources’ received a mean rating of 3.79 (SD = 1.05), while ‘data description and documentation’ scored 3.75 (SD = 1.14). Libraries should prioritise legal and policy skills, knowledge of resources and RDM principles. Additionally, they should consider targeted training for areas with lower mean ratings and diverse opinions, such as technical skills and understanding researchers’ needs.

Table 3 summarises the essential skills required for providing RDM services, including each skill’s mean and standard deviation values. ‘Data ethics’ received the highest mean rating (M = 4.48, SD = 0.76), followed closely by ‘data visualisation’ (M = 4.43, SD = 0.87) and ‘metadata standards’ (M = 4.36, SD = 0.9). This demonstrates the crucial importance of these skills in RDM. ‘Data management planning’ received a mean score of 4.27 (SD = 0.9), while ‘understanding different types of data structures and file formats’ had a mean of 4.22 (SD = 0.88). ‘Big-data analytics’ (M = 3.79, SD = 1.06), ‘identifying data repositories for various subject areas’ (M = 3.76, SD = 1.12), ‘deep-learning techniques’ (M = 3.66, SD = 1.02) and ‘proficiency in qualitative analysis and statistical analysis’ (M = 3.65, SD = 1.14) received lower mean ratings. These findings suggest that there are areas for improvement and development in RDM services. Organisations should strengthen the top-rated skills while considering targeted training to enhance competencies with lower ratings and varied opinions. Understanding the mean and standard deviation values helps prioritise skill development efforts and tailor training programmes to meet specific RDM service requirements.

Table 4 presents the data analysis of the approaches used by libraries to develop users’ RDM skills. The data is based on the responses from the 180 participants, and it is important to note that the participants were allowed to select more than one approach. The most prevalent approach reported by the participants was ‘collaboration with an academic programme to develop professionals with skills related to research data services’, which received a significant response rate of 93.9%, indicating the high relevance and effectiveness of partnering with academic programmes to enhance RDM skills. The second most popular approach was ‘support for staff to attend conferences or workshops on RDM’, with a substantial percentage of 91.7%. This highlights the value of empowering library staff with up-to-date knowledge and expertise through external events focused on RDM.

The libraries also rely heavily on ‘in-house staff workshops or presentations’ as an approach to skills...
development, as indicated by 87.2% of the respondents. This method allows libraries to tailor training sessions to meet their needs and cater to their staff’s requirements. Finally, ‘support for staff to take courses related to research data services’ was selected by 73.9% of the participants, demonstrating an interest in providing comprehensive training opportunities for staff members.

The results in Table 4 suggest that libraries recognise the significance of continuous learning and development in RDM. By embracing multiple approaches simultaneously, libraries can effectively foster a skilled workforce that is capable of providing valuable research data services to their users. The flexibility in allowing the participants to choose multiple approaches reflects the diverse and dynamic nature of RDM skill development in libraries, ensuring a well-rounded and competent support system for researchers and other library users.

Discussion

Figure 1 shows the gender distribution among the 180 participants, revealing that 63.3% were male and 36.7% were female. By providing a broad perspective of the respondents, this core demographic insight sets the stage for the following analysis. Figure 2 provides a complete depiction of the RDM services environment. Notably, 31.1% of the respondents said that RDM services were available, while 68.9% said they were not. This indicates a major need for improvement in supporting RDM, consistent with previous studies by Corrall et al. (2013) and Tenopir et al. (2020) highlighting the lack of RDM services in libraries. Furthermore, Chawinga and Zinn (2020) agree with these findings, citing the introduction of RDM as a concept in East African libraries.

Figure 3 delves deeper into the frequency of RDM services, finding that 68.9% of the respondents said RDM services had never been performed in their libraries. This scarcity of regular RDM services highlights the critical need for infrastructure improvements and public awareness efforts to provide researchers with adequate data management solutions. According to Lu et al. (2018) and Wang et al. (2016), there is a gap between the perception and practice of RDM among librarians. Table 1 shows that certain RDM services provided by the libraries stand out, with the most common being ‘data publishing, sharing, and reuse’ (27.2%) and ‘carrying out long-term preservation of research data’ (26.7%). Libraries’ commitment to complete RDM support is demonstrated by their varied services, including data analysis and visualisation, training and advisory responsibilities. These findings are consistent with those of Chawinga and Zinn (2020), Hrynaszkiewicz et al. (2020) and Jones et al. (2019), all of which emphasise librarians’ ability to provide RDM services.

Table 2 explains the RDM skill development needs, emphasising the importance of ‘legal, policy and advisory skills’, with the highest mean value of 4.33. The findings emphasise the need to prioritise skill development efforts in the legal and policy domains, which is consistent with the studies of Anyaoku et al. (2018), Federer et al. (2020) and Tang and Hu (2019). Table 3 shows that ‘data ethics’ ($M = 4.48$), ‘data visualisation’ ($M = 4.43$) and ‘metadata standards’ ($M = 4.36$) obtained the highest mean ratings for individual RDM abilities. These findings highlight areas of strength and reveal sectors that demand focus and development, such as big-data analytics and qualitative analysis. The findings support Cox et al.’s (2019) and Chawinga and Zinn’s (2020) research in emphasising the critical abilities that librarians require to provide effective RDM services.

Finally, Table 4 describes the ways in which libraries help users enhance their RDM skills. ‘Collaboration with an academic programme’ (93.9%) and ‘support for staff to attend conferences or workshops on RDM’ (91.7%) stand out as common strategies. Staff courses and in-house workshops are also popular, demonstrating a diversified commitment to continual learning. These findings are consistent with those of Jones et al. (2013), who indicate that educational institutions are now establishing infrastructures to support researchers’ data management and storage repository services. Lewis (2010) states that RDM should be integrated into curricula to increase librarians’ acquisition of skills and enable effective RDM service delivery. One of the barriers to RDM skill development is the lack of a policy to guide RDM. According to Howie and Kara (2022), the number of data-sharing policies in New Zealand had decreased in 2018 compared to 2012.

This study highlights the crucial need to improve RDM services at these institutes and universities. The availability, frequency and skill development discrepancies highlight the significance of tailored interventions to close these gaps. Libraries’ dedication to various RDM services and skill development initiatives indicates a promising future. Addressing these findings could increase research productivity, data integrity and data-sharing compliance while aligning with broader efforts to advance RDM practices in academic contexts.
Recommendations

The findings from this study underscore the critical need for strategic interventions to strengthen RDM services within East African libraries. First, institutions should prioritise developing comprehensive plans to introduce and support RDM services. This should involve strategically allocating resources and funds to establish the necessary infrastructure, tools and training programmes to support RDM services consistently. Moreover, a focus on capacity building through regular workshops and training sessions, specifically targeting priority areas such as legal, policy and advisory skills, is paramount. Collaborative efforts between libraries and academic programmes should be fostered to integrate RDM concepts into curricula, ensuring a well-rounded education for students and researchers. Additionally, formulating and implementing clear policies and guidelines tailored to RDM practices within institutions is crucial, providing a structured framework for effective service delivery. Continuous assessment and feedback mechanisms should be established to gauge service effectiveness and identify areas for further enhancement.

A concerted effort to diversify RDM services within libraries is essential, concentrating on areas with a low frequency of implementation. Libraries should foster interdisciplinary collaborations across departments to develop holistic RDM approaches. It is imperative to create awareness campaigns to emphasise the significance of RDM practices and their inherent benefits among researchers, students and faculty members. Investing in technological tools and the infrastructure necessary for advanced RDM services will significantly facilitate efficient data management, storage and analysis. Encouraging libraries to benchmark with global institutions will foster the adoption of innovative practices, contributing to the continual improvement of RDM services.

Conclusion

RDM is an indispensable aspect of modern academic libraries worldwide and crucial for fostering effective scholarly endeavours and ensuring data integrity and accessibility. The findings from this study of selected East African libraries shed light on a global concern: the inadequacies in RDM services and skill development. The identified gaps in service provision, frequency and skill development resonate beyond East Africa, reflecting a broader global need for strategic interventions. Institutions worldwide must recognise the urgency of enhancing RDM services within libraries.

The strategic recommendations encompass the development of comprehensive plans, capacity building through training, collaborative efforts with academic programmes, policy formulation and continuous assessment. These recommendations hold relevance on a global scale and are applicable to libraries across diverse socio-economic and cultural landscapes. Moreover, the suggestions for diversifying RDM services, interdisciplinary collaborations, awareness campaigns, technological integration and benchmarking resonate universally. Libraries worldwide must embrace these suggestions to evolve and adapt to the changing landscape of data-driven research.

This study underscores that while the specific nuances of RDM service provision may vary across regions, the core challenges and strategies for improvement remain consistent globally. Addressing these challenges and implementing the suggested measures is imperative for libraries worldwide to effectively manage research data, ensure data integrity, facilitate collaborative research and contribute meaningfully to the scholarly ecosystem. These strategies will strengthen the global academic community by fostering robust, transparent and accessible research practices.

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Information competency assessment of undergraduates: A Pakistani perspective

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Abstract
Students who possess information competency are better equipped to use the large volumes of data at their disposal and think critically and creatively. This study aims to address the research gap in Pakistani higher education by examining the information competency of undergraduate students at a premier university. A cross-sectional survey was conducted with 669 undergraduates, using descriptive and inferential statistics to draw inferences. The study found that students perceived their information competency to be slightly higher than average, with no significant difference based on gender or academic year. The subject domain significantly predicted students' information competency level, with engineering students expressing higher information competency levels than students from other disciplines. The social sciences group of students reported feeling less information competent compared to the other five groups. The study addresses the literature gap and provides crucial measures for academicians and library practitioners to create effective digital and information literacy programmes for university students.

Keywords
Information literacy, higher education, undergraduate assessment, Punjab University, Pakistan, digital literacy

Introduction
Information overload is a known phenomenon for information consumers in the contemporary world because of the abundance of information available from multiple sources. In 2021, the volume of data created every day was 2.5 quintillion bytes (Johnson, 2023). We know how ‘information overload’ feels: overwhelming, discouraging, frustrating and even conquering. This information explosion has created several authenticity, legality and accuracy issues. In contemporary society, every individual needs not only the sources to obtain desired information but also the skills to acquire that information. Like other business sectors, the value of information competency in the education system cannot be overemphasized (Osman, 2017). Information competency is a core literacy of the 21st century that reinforces all other forms of literacy (Garner, 2005).

According to the Chartered Institute of Library and Information Professionals, information literacy is ‘the ability to think critically and make balanced judgments about any information we find and use. It empowers us as citizens to reach and express informed views and to engage fully with society’ (MacDonald, 2019). The idea of information competency being part of information literacy emerged in
the 1970s. Paul Zurkowski was the first to introduce the term ‘information literacy’ in 1974. The term has been extended in the technological age, with different definitions, terminologies and additional concepts. Later on, basic cognitive abilities became the part of information competency; these abilities can be enhanced by training or by the natural intelligence of individuals when interacting with information. In other words, the cognitive process is the set of information competencies related to the utility and management of information, which is linked to technological training to use it correctly in different information media (Hernández-Martín and Iglesias-Rodrigues, 2017; Marzal García-Quismondo, 2008).

‘Information literacy competency’ and ‘information literacy skills’ are two terms that are used interchangeably but are not the same. Information literacy competency refers to the knowledge, skills and attitudes involved in recognizing why and when information is needed, where to find it, and how to evaluate, organize, manage and use it ethically and legally. In contrast, information literacy skills are a component of information literacy competency that include knowledge and attitudes (Anunobi and Udem, 2014). Thus, information competency is the assimilation of information literacy, developing areas in which an individual can be trained to become information literate. Information competency is a survival skill in the information age. The significance of this notion is that a person who is information competent is a lifelong learner. Hence, information competency is essential in becoming information literate.

Across the globe, the standards of higher education have changed because of information technologies (Jefferies et al., 2018). Learning in the knowledge-based economy has changed from text-based to resource-based learning. For contemporary learners, information competency is considered to be the life-blood that nourishes a problem-solving approach and thinking skills. So, in the changing dynamics of the information world, students are key actors who support the creation of new knowledge by using data, information and scholarly material ethically (Association of College and Research Libraries, 2015). Scholars also perceive that the information competency of university students can be increased with the help of information literacy programmes (Loo and Chung, 2006).

Students’ competencies in higher education are supposed to be multifaceted and, at the same time, specific to a field of study. In the digital world, students should have not only basic information literacy skills but also more advanced competencies. The evolution of information technologies challenges traditional pedagogies, key processes and the management of higher education. Students in the technological era, growing up as digital natives, should have advanced information literacy skills. To produce market-oriented graduates, Pakistani universities are concentrating on improving students’ information competency by offering digital literacy programmes. In Pakistan, the diffusion of information and communications technologies (ICTs) and smart technologies, the Internet of Things and cloud computing, for example, is visible in the higher education sector (Asim et al., 2022). The phenomena of information overload, the proliferation of smart technologies and the digital transformation that is taking place in the Pakistani higher education sector emphasize the importance of digital and information competencies. However, the literature shows that there is a scarcity of studies on this topic. Thus, it is necessary to assess the information competencies of university students in Pakistan and fill this gap in the literature.

**Literature review**

This literature review covers the research that has been conducted to assess the information competency level of undergraduate students across the globe. The review of the relevant literature reveals that information literacy is a core competency in the information age and has become an essential skill for survival in the digital world. Information competency has gained attention in the developed world, while in Pakistan this area of study still requires the attention of both academicians and practitioners. The review of the extant literature shows that information competency is a neglected area of study in the Pakistani higher education context. Many studies have addressed undergraduate students, but few have assessed the information competency of undergraduates in relation to their gender, academic year of study and discipline.

Due to the information explosion over the last two decades, rapid social changes have been noted worldwide. As a result, information competency has become essential in students’ lives. However, Pakistani students face technological challenges (Ansari and Zuber, 2010; Arshad and Ameen, 2021). Updating information is a continuous process because information is generated and becomes out of date very quickly. In the early years of the digital information age, research reveals that undergraduate students, as neophytes, commenced their research by asking for help from people (e.g. friends, classmates or family), using libraries, and consulting resources such as encyclopaedias or newspapers (Leckie, 1996). Over time, the Internet and databases landscape has grown. It has been chronicled that students’ skills in locating,
Several researchers (Baro et al., 2011; Haider and Ya, 2021; Khanum and Bashir, 2021) have identified that undergraduates are lacking ICT and searching skills. In contrast, Allari et al. (2022) claim that students have good technological abilities to acquire the desired information. Nakaziba et al. (2022), Ozden et al. (2020) and Podgornik et al. (2015) clarify that those students who take information techniques or information literacy courses exhibit strong information competency compared to those who do not. Therefore, researchers have suggested information literacy training programmes for university students (Rafique and Khan, 2018). Moreover, Nahyun and Hana (2011) point out that young undergraduates have less information competency than older students, while Govindarajan and Dhanavandan (2018) and Ozden et al. (2020) claim that the information competency level of undergraduates is independent of age. Conway (2011) found that undergraduate students in their twenties gained more information competencies compared to students in their thirties. Conway’s study also found that the information competency of students varied with age but also depended on a student’s past experiences. Unlike Conway, Hill et al. (2013) and Turusheva (2009) conclude that fresh undergraduates are less competent, while Zeeshan et al. (2020) determine that senior undergraduates have more information competency. This is consistent with Amung’a’s (2011) observation that IC is beneficial for first-year students because the vast majority attend institutions with no information competencies.

According to Carter-Templeton et al. (2013), undergraduates have a poor level of identification of information sources, uncertain level of recognition of information and use of scholarly work, and limited abilities to assess and use information for tests, examinations, assignments and writing research papers. A similar situation is evident in Pakistan (Ali et al., 2010; Hussain et al., 2022; Khanum and Bashir, 2021; Kousar and Mahmood, 2013; Rafique and Khan, 2018). However, based on a study of a Pakistani university, Zeeshan et al. (2020) claim that senior undergraduates possess the skills to locate, search and authenticate retrieved information. Rafique and Khan (2018) identify that students are not trained to leverage advanced search strategies and have little knowledge about intellectual property rights and ethical issues. Kousar and Mahmood (2013) and Ozden et al. (2020) found that males and females have the same information competency level, while the studies by Nahyun and Hana (2011) and Rafique and Khan (2018) illustrate that females are more information competent compared to males. Pinto et al. (2016) reveal that there is a significant difference between gender beliefs in the importance of information competency, but no significant difference in self-efficacy.

Hill et al. (2013), Ozor and Toner (2022) and Turusheva (2009) studied multidiscipline undergraduates and determine that first-year and second-year students lack information competency. In contrast, Govindarajan and Dhanavandan (2018) claim that students have good information competency levels. Hussain et al. (2022) detect that social sciences and humanities students demonstrate low information competency levels compared to science students. In their study, Pinto et al. (2016) found that social sciences undergraduates are less competent. Nahyun and Hana (2011) investigated science and engineering students and found that young students are less competent than older students. McGuinness (2006) studied the perceptions of faculty and found that information competency is learned independently by students themselves. However, students indicated that if it was not a graded assignment, they would not spend time learning these skills. Bundy (2002) highlights that, in the 21st century, the more people have upgraded access to information, the more knowledge in the identification of information needs and the skills to use it needs to be at the core of the educational process. The literature on information competency from the perspective of undergraduate students shows that those students who are ‘not competent’ in information literacy often have high self-efficacy when they are asked about their perception of information competency (Gross, 2005; Gross and Latham, 2011a, 2011b, 2012; Latham and Gross, 2008).

With the latest technological advancements in the accessibility of information materials, acquiring information competency abilities is critical. Contemporary students first approach Google and Wikipedia if they require information and are oblivious to the constraints of these resources. Graduate-level students are considered mature researchers; however, they also approach Google as the first point of contact for information and only later consult knowledge resources in libraries (Williamson et al., 2008). Even senior students may lack Boolean and other advanced search strategies (Bloom and Deyrup, 2012). Likewise, undergraduate students lack the ability to access information (Carter-Templeton et al., 2013; Hussain et al., 2022; Ozor and Toner, 2022). Nakaziba et al. (2022) emphasize the importance of information literacy skills and abilities. Turusheva (2009) found that
students prefer the Internet, which provides quick access to information compared to library resources. Allari et al. (2022) argue that students are good at using technology but lack the ability to obtain information from the mass media.

Statement of the problem
In the information society, information competency has become crucial to becoming a self-learner. In this respect, information professionals and curriculum designers are focusing on information competency instructional programmes to build the information competencies of information users, especially the student community, to cope with their information needs. Internationally, information literacy has gained importance as a core competency. Researchers have assessed students’ information competency levels and found that factors such as academic level, social background, gender, ICT proficiency and English-language proficiency are key antecedents when investigating the phenomenon under discussion. Around the globe, numerous studies have been conducted on the importance and need for information competency. In Pakistan, academicians and professionals have paid less attention to examining students’ information competency in higher education institutions (Kousar and Mahmood, 2013). Few studies have assessed the information competency of Pakistani undergraduate students (Zeeshan et al., 2020). Bhatti (2010) criticizes that most universities offer poorly planned and informal user education programmes without assessing their users’ information needs. So, in light of the significance of students’ information competency in the knowledge-based economy, this study aims to fill the research gap in the extant literature from the Pakistani perspective.

Aim of the research
This study aimed to investigate the information competency level of Pakistani university students based on their demographics, academic level, gender, academic discipline and year of study. To achieve this aim, the following four research questions were addressed:

1. What is the information competency level of undergraduate students at the University of the Punjab, Lahore, Pakistan?
2. Is there any significant difference in the information competency level among the students based on gender?
3. Is there any significant difference in the information competency level among the students based on academic discipline?
4. Is there any significant difference in the information competency level among the students based on their year of study?

Research design and methodology
The study used a quantitative survey research design underpinned by positivist philosophy to investigate the information competency level of undergraduate students in Pakistan. A cross-sectional survey design was utilized to collect data from the respondents. Saunders et al. (2016) state that quantitative research, using a survey methodology, is a suitable research design to test established scales by applying relevant statistical techniques. A similar approach was adopted by other researchers to examine the perceived level of information competency among graduates and undergraduates in Jordan (Allari et al., 2022).

Data collection
Currently, there are 223 public and private universities in Pakistan (Asim et al., 2022). This descriptive study was conducted at the University of the Punjab, which was founded in Lahore in 1882. It is the largest and oldest public-sector university in Pakistan. The university comprises 5 campuses, 19 faculties, 8 constituent colleges, and 138 centres and institutes. Using convenience sampling, the survey was administered to undergraduate students in five disciplines – sciences, engineering, social sciences, business, and arts and humanities – at the main campus (Quaid-e-Azam Campus). Convenience sampling is usually low-cost and is an easy method of collecting data from a larger population. Moreover, it gives the study’s participants the opportunity to take their time to think and answer the questions (Saunders et al., 2016). The data was collected over four months (March and June 2022) using electronic and paper-based modes. The students participated in the survey voluntarily and a total of 669 responded (see Table 1).

Instrument and measurements
A well-established information competency scale was used to conduct this study. Several researchers have used Marshall’s (2006) Information Competency Assessment Instrument to investigate information competency among university students (Allari et al., 2022; Urra et al., 2021). After analysing the extant literature, it was evident that Marshall’s instrument would be an exhaustive tool for evaluating students
from a developing country such as Pakistan where information literacy instruction is still in its infancy (Batool et al., 2022), very basic compared to what people really need (Batool and Mahmood, 2012) and focused on library orientation instead of information literacy components (Rafiq et al., 2020). Moreover, the Information Competency Assessment Instrument’s 10 dimensions mean that it was a better choice for investigating the phenomenon in a comprehensive manner compared with the other instruments available.

The instrument measures the different levels of skills that are needed to be information competent. Marshall (2001) claims that the Information Competency Assessment Instrument demonstrates good reliability and validity. It has 10 dimensions that include 40 statements based on closed-ended questions. These dimensions are considered important for individual competency and are: (1) recognize the research topic; (2) identify the source requirements; (3) know how to search to fulfill needs; (4) know how to discover and retrieve information; (5) selection and use of an appropriate medium for the information; (6) evaluation; (7) synthesize and organize the information; (8) present the information; (9) understand the legal, ethical and ideological issues of the information; and (10) get feedback and learn from it for future projects. This study made minor modifications to the instrument. First, it excluded the statements of the instrument that were negative in context; second, the demographic details (gender, subject, degree programme and semester of study) of the sample population were included to assess the correlation. A 7-point Likert scale was used for the measurement (1 = strongly disagree to 7 = strongly agree).

### Data analysis

The collected data was analysed using Version 22 of the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were applied to draw the results from the data to describe the participants’ gender, academic level, academic education and information competency level. Statistical tests – t-test, one-way analysis of variance (ANOVA) and post hoc least significant difference (LSD) – were run to find out the differences among the variables. The alpha level was set at .05. A total outcome was obtained for the information competency level and dimensions.

### Findings

The study illustrates the information competency level of undergraduate students with respect to demographic variables including gender, academic year and academic discipline. The total score for information competency, sample attributes, scores of each dimension, significant differences and correlation are interpreted in the conclusion.

#### Demographics

There was a total of 669 respondents from the undergraduate level, of which 200 (29.9%) were male and 469 (70.1%) were female. The respondents were from the University of the Punjab. Data was collected from students in five disciplines: sciences, social sciences, arts and humanities, business and engineering. Most of the respondents were from the social sciences (29.6%; see Table 1).

#### Information competency level of undergraduate students

Information competency is vitally important for lifelong learning. So, to answer Research Question 1 – What is the information competency level of undergraduate students at the University of the Punjab? – the mean and standard deviation were computed for the 10 dimensions of the information competency scale. Among the information competency factors, ‘synthesize and organize the information’ had the highest mean value ($M = 4.70$, $SD = 1.94$), which indicates that the students could somewhat organize and synthesize information. Likewise, the students showed positive perceptions of other information competency dimensions – for example, ‘identify the source requirements’ and ‘know how to discover and retrieve information’. However, they had a neutral opinion with regard to three dimensions – ‘know how to search to fulfill needs’, ‘know how to discover and retrieve information’ and ‘understand the legal,
ethical and ideological issues of the information'. The factor 'know how to search to fulfil needs' had the lowest mean score \( M = 4.08, SD = 2.02 \). Moreover, the students were unable to understand the legal, ethical and ideological issues of information. It is important to understand why the students did not comprehend the legal, ethical and ideological issues of information.

Overall, the information competency level of the students was above the average score \( M = 4.50, SD = 1.21 \), revealing that the students somewhat agreed with the 10 dimensions of information competency (see Table 2).

### Differences in information competency in terms of gender

An independent samples t-test was applied to check the information competency difference based on gender (Research Question 2). The statistical results show that there was no significant difference in information competency based on gender \( (t = -1.091, p = .276) \). It can be concluded that both male and female students possessed the same level of information competency (Table 3).

### Differences in information competency in terms of academic discipline

Since the respondents belonged to five academic disciplines, a one-way ANOVA was run to examine any differences in their self-perceived information competency based on their academic discipline (Research Question 3). The results reveal a significant difference in the students’ information competency level based on their academic discipline \( (F = 3.836, p = .004; \text{Table 4}) \). This means that the students’ information competency varied from discipline to discipline. This finding led to the application of an advanced statistical test to analyse the data for more in-depth insights.

The one-way ANOVA test was found to be significant, hence a post hoc LSD was applied to establish the differences between the groups (Table 5). The statistical analysis reveals that the social sciences students’ information competency level was significantly different from that of the business \( (p = .025) \), arts and humanities \( (p = .035) \) and engineering \( (p = .001) \) students. The social sciences students were less competent \( (M = 4.21) \) while the engineering students had high competency \( (M = 4.82) \) compared to the other groups. The engineering group also showed a significant difference \( (p = .005) \) in their information competency level from the sciences group (Table 5). The comparison of all the groups’ mean scores indicates that the engineering students had a comparatively higher information competency level.

### Differences in information competency in terms of academic (study) year

The respondents were students in a four-year Bachelor of Science (Honours) programme. Research Question 4 explored the significant differences in the information competency level among the students based on their year of study. A one-way ANOVA was applied to find the differences based on academic year. The means, standard deviations, f-values and p-values (sig. 2-tailed) were calculated. The analysis
indicates that there was no significant difference among the students in terms of their year of study (Table 6).

Table 5. Post hoc LSD results based on academic disciplines.

<table>
<thead>
<tr>
<th>Academic discipline (I)</th>
<th>Academic discipline (J)</th>
<th>Mean difference (I–J)</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sciences</td>
<td>Social sciences</td>
<td>0.07891</td>
<td>0.12400</td>
<td>.525</td>
</tr>
<tr>
<td>Business</td>
<td>Social sciences</td>
<td>-0.33135</td>
<td>0.18424</td>
<td>.073</td>
</tr>
<tr>
<td>Arts and humanities</td>
<td>Social sciences</td>
<td>-0.19028</td>
<td>0.13126</td>
<td>.148</td>
</tr>
<tr>
<td>Engineering</td>
<td>Social sciences</td>
<td>-0.45716*</td>
<td>0.16396</td>
<td>.005</td>
</tr>
<tr>
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<td>Business</td>
<td>-0.07891</td>
<td>0.12400</td>
<td>.525</td>
</tr>
<tr>
<td>Business</td>
<td>Business</td>
<td>-0.41026*</td>
<td>0.18224</td>
<td>.025</td>
</tr>
<tr>
<td>Arts and humanities</td>
<td>Business</td>
<td>-0.26919*</td>
<td>0.12845</td>
<td>.036</td>
</tr>
<tr>
<td>Engineering</td>
<td>Business</td>
<td>-0.53608*</td>
<td>0.16171</td>
<td>.001</td>
</tr>
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<td>.452</td>
</tr>
<tr>
<td>Engineering</td>
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<td>-0.12581</td>
<td>0.21147</td>
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<td>0.16735</td>
<td>.111</td>
</tr>
<tr>
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<td>Engineering</td>
<td>0.26688</td>
<td>0.16735</td>
<td>.111</td>
</tr>
</tbody>
</table>

*p ≤ .05

Table 6. Academic-year-based differences in information competency (N = 669).

<table>
<thead>
<tr>
<th>Academic year</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>f</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>192</td>
<td>4.63</td>
<td>1.00965</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second</td>
<td>191</td>
<td>4.25</td>
<td>1.53041</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third</td>
<td>183</td>
<td>4.44</td>
<td>1.63245</td>
<td>1.734</td>
<td>.098</td>
</tr>
<tr>
<td>Fourth</td>
<td>103</td>
<td>4.30</td>
<td>1.25840</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

p ≤ .05

indicates that there was no significant difference among the students in terms of their year of study (Table 6).

Discussion

In the age of the knowledge economy, the most important competency for university students is the ability to think critically and analytically. Students should be able to find information, evaluate it and make decisions based on it. The knowledge and skills learned during university life support students in identifying problems, finding creative solutions, and developing strategies for the effective implementation of information in their professional lives. Thus, it is essential to assess university students’ information competency levels, especially from the perspective of the developing world. The review of the extant literature shows that Pakistani academicians and researchers have paid little attention to investigating students’ information competency, therefore this study aimed to investigate the information competency level of Pakistani university students in terms of gender, academic discipline and year of study.

The study’s findings reveal that the majority of the respondents were female and most of the respondents were young and studying in the first and second years of the Bachelor of Science (Honours) programme. Further analysis discloses that the students had competencies in identifying source requirements; the selection and use of an appropriate medium for information; evaluating information; synthesizing and organizing information; presenting information; and getting feedback and learning from it for future projects. Overall, the students were somewhat information competent. These findings are in line with prior studies – for example, Allari et al. (2022), Rafique and Khan (2018) and Zeeshan et al. (2020) found that students had a moderate level of information competency. However, the findings demonstrate a disparity with Hill et al.’s (2013), Turusheva’s (2009) and Ozor and Toner’s (2022) research, which highlights that undergraduates had low information competency.

Student competency is the ability to understand and apply the skills and knowledge needed to complete a task. Consequently, students’ information competency and study discipline are both important components of successful learning. It involves setting goals,
developing effective study habits, and staying focused and organized (Zeeshan et al., 2020). The research findings based on disciplines illustrate that there are significant differences in terms of academic discipline, which indicates that students’ study discipline played a positive role in enhancing their information competency level. Social sciences students’ information competency is at the lowest level, whereas engineering students have a comparatively better level of information competency. In a similar study, Zeeshan et al. (2020) disclose that social sciences students had low information competency levels compared to sciences students. One of the reasons for this may be that, in Pakistan, academically bright and innovative students are more inclined to opt for sciences and applied sciences disciplines for better career prospects. The findings also reveal that the gender and academic year of the undergraduate students did not have any effect on their information competency level. The research of Govindarajan and Dhanavan-dan (2018), Kousar and Mahmood (2013) and Ozden et al. (2020) also supports this study’s findings. It is important to mention that the curricula of the Bachelor of Science (Honours) programmes do not include any courses on information literacy, and it is a similar situation in the libraries, which teach library orientation instead of information literacy. The findings highlight the gap between curricular and library interventions in this regard. It seems appropriate for universities to include digital and information literacy courses in the curricula of Bachelor programmes. Academic departments and institutes within the university should design courses on information literacy, digital literacy and media literacy. Courses or curricular contents should also focus on developing students’ critical and information evaluation skills. University libraries could also offer information literacy programmes for undergraduate students to improve their information competencies – particularly for social sciences students. As the study reveals that academic discipline influenced the information competency of undergraduates, training programmes should exert counter-influences by tailoring their interventions accordingly.

According to seven-point Likert scale, students showed their opinions above average except for three dimensions of information competency – searching relevant information; 1) searching for relevant information 2) discovering and retrieving the information 3) legal, ethical, and ideological issues of information knowing how to discover and retrieve information; and understanding the legal, ethical and ideological issues of information. In the digital world, university students should be knowledgeable about the searching and retrieval of information, and the legal, ethical and ideological issues of information. Training programmes on search engines, databases and other online resources can help them to become more familiar and competent with the technological platforms for information searching. Hands-on experience through providing practical, lab-based assignments and activities should also be incorporated by course instructors. Students can be assigned research topics and information tasks to find, retrieve and use information by considering legal, ethical and subjective norms.

Research limitations and directions for future research

Like other research studies, this research has some limitations. First, the study’s sample consists of undergraduate students in five disciplines only. Future researchers should also consider graduate students. Moreover, a self-reporting quantitative survey methodology was employed to conduct this study. In contrast to quantitative investigation, qualitative research provides more in-depth information and insights that allow researchers to explore the meanings, experiences, beliefs and perspectives of a study’s population (Saunders et al., 2016). So, for deeper insight into students’ information competency level, qualitative research could provide a more holistic picture of the phenomenon under study.

Secondly, a convenient sample of undergraduate students form one university across five academic disciplines participated in this study. Thus, the results of this study cannot be generalized. Moreover, the study data was based on the self-perceptions of the respondents. Thus, the findings may be used by considering the Dunning–Kruger effect (Kruger and Dunning, 1999). The Dunning–Kruger effect is a cognitive bias whereby people with low ability or knowledge regarding a certain type of task or area of knowledge tend to overestimate their ability or knowledge. Past studies (Gross, 2005; Gross and Latham, 2011a, 2011b, 2012; Latham and Gross, 2008) also endorse that the Dunning–Kruger effect applies to information-competency-related studies.

Finally, this study adopted a cross-sectional survey and collected data during a limited time frame. Thus, future researchers should conduct a longitudinal study, which could perhaps provide more fruitful insights into students’ information competency.

Conclusions

In the contemporary world, information competency is the combination of knowledge and essential skills
to find, evaluate and use information effectively and efficiently. It is a key component of success both in university life and one’s professional career. With the ever-increasing amount of information available, students must learn how to navigate this information landscape to make informed decisions. However, research on students’ information competency from the Pakistani perspective lacks theory and practice. Therefore, this study has sought to fill this research gap by investigating Pakistani undergraduate students’ information competency level. Adopting a quantitative survey approach, the study used an established information competency scale to examine the phenomenon in depth. Overall, the research findings disclose that the students possessed above-average information competency in all but three of the dimensions.

This research has key theoretical and practical implications. Both academicians and practitioners need to concentrate on the issues associated with the legal, ethical and ideological aspects of information and how to utilize different information channels in the digital world. Moreover, well-designed information and digital literacy programmes may work well to improve students’ information competency levels. Information literacy courses or contents should be part of undergraduate curricula in different disciplines. Moreover, educators and librarians may also design training programmes to take care of the needs of students and enhance their information competencies. Further studies are also needed to conduct on the phenomenon of information competency especially in Pakistan.

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Redefining academic library work: Telecommuting potential in post-COVID Ghana

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Abstract
Traditionally, librarians have been limited to a physical facility either because their role demanded face-to-face interaction or because they had their work materials housed in the building. With the work of libraries and librarians increasingly becoming more mobile, a lot of work can conveniently be done from a laptop at any location. This study assessed the points of view of academic librarians in Ghana on telecommuting and its feasibility in the Ghanaian landscape. It employed an exploratory case study design to sample a total of 57 respondents through the administration of a questionnaire. The findings reveal that the academic librarians were in favour of telecommuting and were willing to telecommute at least once a week. Additionally, there was the improved benefit of having flexible working hours and reduced travel time. A major challenge that was expected to be encountered was the resistance of management to formally adopting telecommuting.

Keywords
Academic libraries, family, post-COVID, remote work, library management

Introduction
In December 2019, there were news reports of the rapid spread of the COVID-19 virus in China. Within a few months, the virus had spread to many more countries across the globe and much of the world’s population was forcibly quarantined in their homes in a bid to stop the spread (Ali and Gatiti, 2020; Chigwada, 2021; Rajapakshe, 2021). Additionally, offices, schools and day-care centres had to be shut down, increasing the need for parents to be at home and launching us into a more virtual world (Bontrager et al., 2021). Davis et al. (2020) describe the situation as the ‘new normal’, where there was a transition from having to wear business attire to working at home in casual clothes; in-person meetings to online meetings; and face-to-face teaching to online assignments and virtual lessons. One important feature that arose in the wake of the COVID-19 pandemic was telecommuting. Doyle (2020) describes telecommuting as an arrangement between an employer and an employee whereby the employee works outside of the employer’s office with the aid of technologies to assist them in carrying out their duties and connecting with colleagues.

However, the concept of working from home is not a new development. ‘Telecommuting’ has been in existence as a means to ensure some flexibility in organizations since the 1970s (Haddon and Lewis, 1994). The rapid development of the Internet, coupled with a multitude of digital tools and systems, has greatly influenced the trend of organizations to allow alternative work arrangements where staff undertake their tasks remotely. Additionally, it seems to have suddenly experienced a rebound as a result of some of the measures put in place to protect citizens from the ravaging effects of COVID-19 (Belzunegui-Eraso and Erro-Garcés, 2020). On the other hand, while world economies took a dip, there was the need for organizations to do all that they could to continue progressing and, as a result, many employees found themselves working from home and changing their work to completely virtual environments (Bontrager et al., 2021).

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Academic libraries in Ghana were not spared from this development. For instance, in a bid to curtail the spread of the virus, the initial response of the government was to order the closure of all schools, including universities, in March 2020 (Arhinful, 2020). Social distancing and stay-at-home orders compelled universities to switch immediately, mid-semester, from traditional face-to-face learning to remote learning through virtual classrooms in an attempt to keep up with their academic calendars. The switch was quite abrupt and had a great impact on service delivery, especially from libraries. Although Ghanaian academic libraries were known to provide some online services to customers – such as access to electronic databases – the majority of users were conversant with visiting physical library buildings for their needs since most library services needed to be accessed in person. The provision of virtual services was almost non-existent in pre-COVID-19 times as libraries were providing the majority of their services face-to-face.

The COVID-19 pandemic, however, brought about some growth and change in the mode of service delivery in academic libraries. For example, Martzoukou (2020) describes academic libraries as being at the forefront of the provision of online learning materials and services, and aiding librarians in supporting staff and students to develop digital literacy skills via virtual means. During this period, the provision of services online was common in libraries, and it has led to an increase in the use of cloud-based systems that do not require library work to be done using specific library staff computers (Connell et al., 2021). Despite the increasing availability of telecommuting opportunities in various sectors, there is limited research on its viability and implementation in academic libraries in Ghana post-COVID-19. The traditional constraints of a physical presence and the need for face-to-face interaction have restricted the exploration of telecommuting as a feasible work arrangement for librarians. With the advancements in information technology and the shift towards virtual library services, there is a need to examine the points of view on and feasibility of telecommuting among Ghanaian academic librarians. Additionally, despite the numerous benefits – including job flexibility and increased productivity – the literature on why it is not being readily adopted is limited. This study seeks to assess the possibility of academic librarians telecommuting in some roles and the opportunities and challenges associated with it. To this end, the study seeks to find answers to the following research questions:

1. What are the appropriate units for telecommuting?
2. What opportunities are available to academic librarians with the integration of telecommuting?
3. What challenges are expected to be encountered with the introduction of telecommuting?

**Literature review**

**Definitions of telecommuting**

Telecommuting or telework is a term that emerged in the 1970s relating to the use of computer and telecommunication components that allow employees to work in locations other than their office (Nilles, 1975). Even though there is no universally accepted definition of telecommuting, it can be described as a work arrangement where employees work with the aid of some computer technologies outside an office (typically at home) to complete set tasks (Gajendran and Harrison, 2007). Ameer et al. (2021) argue that telecommuting involves an employee working outside an office and in most instances at home, although it can be some remote location, with the use of technologies. Behrens et al. (2021) add that telecommuting involves work tasks that are performed from home or satellite offices and may be for several days a week, cutting the time spent in traffic and contributing to a better work life. Also, it can be described as a work schedule that allows a lot more flexibility for employees to work from remote locations rather than moving to a centralized location (Kelly and Shoemaker, 2021).

Belzunegui-Eraso and Erro-Garcés (2020) confirm that telecommuting refers to working outside the employer’s premises with the aid of information and communications technologies, and can occur using different technologies from varying locations. Although the definitions suggest that telecommuting can be practised part-time aside from normal work conventions, a review of the literature suggests that most workers work away from an office on a full-time basis (Bailey and Kurland, 2002). In reality, however, most workers who do telecommute only do so for a few days each month (Azami et al., 2018; Manoochehri and Pinkerton, 2003). Parajuli (2020) further describes telecommuting as the use of personal computers fitted with applications to work for an organization from home. Even though there is no one accepted definition of telecommuting, its meaning is quite consistent among scholars in the field. What is intrinsic about the definitions is that telecommuting involves the use of technology to perform a task outside the original workplace environment. In this
study, telecommuting is defined as a work arrangement where an individual working for an organization completes work assignments outside the organization using telecommunication tools such as email, a phone and other video-conferencing facilities.

Factors that affect telework

As postulated by Baruch and Nicholson (1997), four factors are imperative for the success and effectiveness of telecommuting: individual, organizational, technological, and home and family (Figure 1).

Individual. For telecommuting to take place, the individual plays a crucial role. This is because the individual is at the centre of telecommuting, and its success or otherwise is dependent on the drive and willingness of the individual. Baruch and Nicholson (1997) highlight self-motivation, the ability to work alone, tenacity, being organized, effective time management and computer literacy as the top factors required of an individual to be able to telecommute effectively. Since human beings have different personality types, knowledge of what works best for each individual is necessary to ensure the success of telecommuting. Additionally, Hannay (2014) reiterates that, although technical skills are a primary consideration in successfully fulfilling telecommuting, personality factors must also be carefully considered, especially if the individual will be away from the workplace for a long period of time. Linked to this are the specific roles that can allow for telecommuting. Although teleworking provides some solutions to work-related problems, it is not found to be suitable for all occupations, particularly those requiring face-to-face relations (Azami et al., 2018). Likewise, not every employee will function well in the telecommuting environment, and this makes it imperative to select employees who can function well in such an environment – particularly those who can work with little or no supervision (Manoochehri and Pinkerton, 2003).

Meanwhile, issues such as gender and educational attainment might also influence the choice of telecommuting and its intended success. For example, a policy report published in response to COVID-19 by the Organisation for Economic Co-operation and Development (2021) reveals that workers with higher qualifications, as well as women, are more likely to telecommute. Similarly, Azami et al. (2018) found that female librarians were more inclined towards telecommuting compared to their male counterparts. This may be due to the demands of the home and family that most women are dealing with alongside work in most corporate environments. Parajuli (2020) mentions some advantages of telecommuting for the individual, including flexibility in supervising dependents, less travel time and expenses, flexible working hours and independence. Also, Manoochehri and Pinkerton (2003) report a lower rate of absenteeism, reduced time spent commuting, the ability to balance family needs and lower turnover as factors that ensure high job satisfaction among telecommuters.

Organizational and technological. In addition to individual factors, the role of the organization and the technological infrastructure that has been put in place are essential to the overall success of telecommuting. This includes, but is not limited to, technological training, adequate communication, information technology support from the organization, supporting the demands of employees while they work at home, and support with the cost of facilities related to telecommuting (Vyas and Butakhieo, 2021). Since telecommuting will have an effect not only on employees but also on the organization as a whole, Rajapakshe (2021) reiterates the importance of a high-speed Internet connection, detailed planning and appropriate software for telecommuting to take place.

Also, in considering remote work, an important element is to decide how team members will stay in touch and how customers will be served. To solve this issue, Boudinet (2020) highlights five major technology needs to ensure the success of telecommuting: email, broadband, video conferencing, chats and messaging, and a phone. Similarly, for companies seeking to initiate telecommuting, Pearce (2008) identifies three main technical issues that need to be taken into account.
consideration: connectivity, information sharing and communication. Specifically, issues relating to a high bandwidth, virtual private networks, content sharing, file sharing, online conferencing, audio conferencing and instant messaging need to be well thought through to ensure the success of telecommuting (Pearce, 2008).

A seemingly valid challenge that faces most organizations wishing to implement telecommuting is the security of data and how confidential information will be protected. Common security threats, including stolen laptops, hackers, phishing emails, the use of weak passwords and unencrypted file sharing, need to be carefully considered. Carnahan and Guttman (1998) mention some of the threats to organizations that decide to telecommute: intruders having access to the organization’s systems without being present on-site; hackers watching employees as they enter their passwords; people trying to steal or misuse corporate information; the possibility of corporate information being read or potentially modified while in transit; and the risk of losing corporate information outside the organization’s protective shell. In the same vein, Redcentric (2021) highlights the top-five security concerns of teleworking as phishing attacks, weak passwords, unsecured home devices, unencrypted file sharing and open home Wi-Fi networks. To be able to quickly recover lost data or mitigate the possibility of threats, organizations need to put in place well-established security options, such as antivirus software, firewalls, limiting access to sensitive information, disallowing the use of flash drives, the use of fingerprint readers and content monitoring programmes that can reduce the rate of attack (Pearce, 2008).

Furthermore, an element of trust is necessary to allow telecommuting within an organization. Trust, as highlighted by Baker et al. (2006), can be a somewhat problematic issue and involves both parties — the individual trusting another and the person being trusted. Feelings of uncertainty or doubt on the part of the organization (management) about employees working from home and meeting targets will not allow for telecommuting in the first place. Additionally, employees knowing that they are not being monitored, like they are when working in an office, may tend to be lackadaisical in regard to the tasks assigned to them. Felstead and Reuschke (2020) affirm that a major issue of concern among employers is the belief that without physical oversight, some employees will neglect the duties originally assigned to them, leading to a fall in productivity. Similarly, telecommuting has a greater likelihood of being implemented in settings where there is a high level of trust between employees and employers — where through their actions and performance, managers place a high degree of trust in their employees (Beño, 2021; Daniels et al., 2001). This suggests that strict measures are put in place to guide telecommuters working in different locations in the interest of a company. The importance of the necessary organizational structures, including innovation and top management being in support of telecommuting, cannot be overemphasized (Bose and Luo, 2011). Manoochehri and Pinkerton (2003) add that telecommuters will have to prove themselves worthy by ensuring an increase in productivity to dispel the notion of no work being done when there is no supervision.

Harpaz (2002) identifies some of the benefits of telecommuting for an organization: a decrease in staff absence levels, savings on expenses, increased productivity, a positive image of the organization and increased staff motivation. Similarly, Madsen (2003) sees telecommuting as an advantage for both the organization and the employee that makes it possible to motivate workers and reduce the costs involved with travel. Some examples of the savings that can be made by an organization include the costs of water, electricity, Internet bills, cleaning and security, and salaries (De Graaff and Rietveld, 2006; Radcliffe, 2010). With the increasing costs of housing and the geographical spread of workers, employees are being compelled to adopt telecommuting to ensure productivity, retention and job satisfaction (Pearce, 2008). Despite the perceived benefits, Beño (2021) mentions some of the questions that managers still ask themselves about the viability of telecommuting: Is it a realistic option? Will the potential cost saving outweigh the perceived risks? Is it in line with the business culture? Moreover, Diab-Bahman and Al-Enzi (2020) highlight some limitations of telecommuting, including professional isolation, poor manager–employee relationships, a lack of feedback, poor communication and poor employee–employee relationships.

Home and family. Closely linked to the success of telecommuting is the setting in which it takes place. The definitions of telecommuting indicate it to be a location other than the employer’s premises. One place that has been identified as being useful when telecommuting is the home (Diab-Bahman and Al-Enzi, 2020; Madsen, 2003; Pearce, 2008; Rajapakshe, 2021). Despite being a safe abode, the use of the home has its share of advantages and disadvantages. For example, Parajuli (2020) found that telecommuting makes it difficult to differentiate between work and home, and also
alludes to a sense of over-availability on the part of the worker. Tremblay and Thomsin (2012) add that with the flexibility in working hours that comes from telecommuting, it is not always that easy as there are the intrusions and crossing of boundaries that come with it. Beño (2021) highlights the tendency of having the workplace invade the home and cause one to work much longer than may be desired. Similarly, Vyas and Butakhieo (2021) identify some of the setbacks relating to telecommuting as a difficulty in distinguishing between work and family, employees having to bear costs relating to telecommuting, social isolation and distractions that may affect the output of the worker.

The presence of family members (especially young children) is a significant factor in the success of telecommuting. Rajapakshe (2021) affirms that in situations where family members (especially children) are present, there is a likelihood for them to cause disturbances that will affect the overall output of employees. In a similar study by Khan and Hasan (2020), a poor Internet connection and having children at home served as a source of great distraction, which was not helpful for telecommuting. Women, in particular, have been found to face many more difficulties, balancing home life and fulfilling other domestic duties together with completing work tasks (Basak, 2021; Friedman et al., 2021; Kazekami, 2020). Similarly, Azami et al. (2018) note that female librarians were found to be more interested in teleworking than their male counterparts since they were better able to handle family responsibilities while telecommuting. However, Diab-Bahman and Al-Enzi (2020) note that telecommuting may help men to be more involved in family issues and remove the bias associated with women and families. To mitigate some of the challenges experienced, Rajapakshe (2021) suggests staff training on how best to manage family responsibilities, as well as the provision of incentives that can take care of the cost of data, for example, and serve as a source of motivation.

Impact of COVID-19 on libraries

The COVID-19 pandemic left an indelible impression on a variety of sectors around the world, including libraries. Beyond the issues of health and safety, the pandemic had a profound impact on libraries, ushering in a paradigm shift in the way libraries function, engage with their communities and deliver services. The closure of physical library facilities was a common response (Harris, 2021) and forced the need to plan for how to continue providing and disseminating information to library patrons (Omeluzor et al., 2022). It compelled libraries to be more innovative in their traditional functions and quickly transition towards digital alternatives, including the use of electronic resources, electronic books and digital magazines (Becker et al., 2022; Sujood et al., 2023; Wakeling et al., 2022). Again, during lock downs, academic libraries were critical in providing remote learning options to their patrons. The switch to the use of digital services not only demonstrated libraries’ versatility but also emphasized the importance of their function as dynamic information hubs capable of fulfilling customers’ changing requirements in a time of crisis.

Similarly, librarians used a range of strategies and platforms to cope with the unexpected shift to remote learning and teaching, recognizing that working in virtual and remote environments was critical to their success (Kaufmann and Miller, 2020). In Nigeria, for example, it was found that most university libraries provided online materials for their patrons because most students and faculty members were working at home owing to library closures (Fasae et al., 2020). Martzoukou (2020) affirms that, even before the pandemic, librarians played an important role in encouraging students and faculty to improve their information and digital literacy skills through various online projects, underscoring the importance of libraries in the educational transition to the digital age. Confirming libraries’ status as trustworthy information hubs, De Groote and Scoulas (2021) highlight the increasing rate of reference queries during the pandemic, as well as the virtual assistance offered to patrons in the form of email and chat reference exchanges. Libraries, more than ever, were seen to be accountable for assisting their communities with access to credible information to meet their varying needs.

In response to the changing learning dynamics and student needs, library facilities are being remodelled to maximize patron welfare. Hitherto, library spaces were made available to users for requesting, reviewing and reading printed content (Vassilakaki and Moniarou-Papaconstantinou, 2021). Because of the need for social distancing and maintaining sanitary conditions during the COVID-19 era, physical library areas were reconfigured. Libraries reacted by introducing safety standards, relocating furniture and rethinking rooms to meet the changing demands while guaranteeing patron and staff safety and limiting the spread of the virus (Chigwada, 2021; Garner et al., 2022). Beyond the pandemic, however, modern university libraries have taken the cue and are growing into informal learning spaces that encourage active involvement and collaboration among users (Kim and Yang, 2022). Students, who are the major users of academic libraries, are engaged in various activities,
including group learning and collaborative work, which are not conducive to ‘traditional’ library settings, emphasizing the need for more learning spaces.

Research methodology
The exploratory case study research method was used in this study to analyse the developing interest in telecommuting among academic librarians, with special attention to academic librarianship in Ghana. As highlighted by Babbie (2014), exploratory studies aim to satisfy a researcher’s curiosity and provide a better understanding of a phenomenon. Head librarians from academic libraries in Ghana were carefully chosen as the target population for this study. The listserv of the Consortium of Academic and Research Libraries in Ghana served as the primary medium for communicating with this specific set of respondents, ensuring that the questionnaire was sent to its target audience. To extend the scope of opinions and deepen the research, the participants were urged to share the electronic survey with suitable peers who met the inclusion criteria but were not members of the Consortium. This strategy was an attempt to gain a more comprehensive grasp of the subject matter by embracing several points of view, hence increasing the depth and completeness of the research. Altogether, 57 respondents completed the electronic survey. Data collection was through the use of a semi-structured online survey questionnaire, designed by the researcher with Google Forms, between the months of April and May 2022. The respondents were duly informed about the objectives of the study and were assured of the confidentiality of their data. They were asked not to disclose any personal information, such as their names. Also, all of the respondents were assured that their responses were intended solely for academic purposes, and were encouraged to answer as freely and honestly as possible.

Findings and discussion
The raw data was used to generate a descriptive analysis and draw conclusions with respect to the arguments of the research. Each question was analysed using the Microsoft Excel application to help shed more light on the study’s objectives.

Areas best suited for telecommuting
To put the study in a proper perspective, the respondents were asked to explain how they understood the term ‘telecommuting’. This was necessary to help provide insights into how telecommuting is viewed amongst academic librarians. It was evident from their responses that the respondents were familiar with the term or had a little knowledge of it. For example, one respondent understood telecommuting as follows: ‘Performing the duties of a librarian outside the workplace with the use of technology’. Another respondent asserted that telecommuting is ‘working from home with the use of computers, email or telephone’. Additionally, telecommuting was seen to be ‘completing work assignments outside the conventional work environment using technological tools’.

The respondents were also asked if they believed there were enough resources available to meet the needs of library users outside library buildings. The majority of the respondents (37, 64.9%) affirmed that there were enough resources available outside the four walls of library buildings for users to access. The most mentioned resources were electronic resources and journal databases. Other resources cited were past questions, library catalogues and reference services. Academic libraries keep reinventing themselves by using different techniques in a bid to meet the needs of their users. Studies in Ghana have affirmed the increasing number of subscriptions to electronic resources by academic libraries to help enhance their collections and also widen access to scholarly materials (Baayel and Asante, 2019; Bentil, 2020; Okyere-Kwakye and Nor, 2020; Tetteh, 2018). In Ghana, access to electronic resources is provided through the Consortium of Academic and Research Libraries in Ghana, a body that was set up to facilitate resource sharing among its member institutions (Asamoah-Hassan, 2014). Baayel and Asante (2019) report that the University of Cape Coast, a public university in Ghana, pays as much as $10,000 in subscription fees per year. Through the Consortium, access to electronic resources has been made easier than it would have been if each institution were subscribing on its own. Additionally, access is provided both on-campus and off-campus (on request), enabling access by a far wider audience beyond the actual library building.

Another question posed to the respondents was whether their work could support telecommuting and also which areas of library work they believed could easily support telecommuting. Fifty-two respondents (91.2%) affirmed that their roles could conveniently be carried out outside the library building, with 5 (8.8%) disagreeing with this assertion. With regard to the areas of library work that could easily be supported by telecommuting, the provision of electronic resources was the most mentioned service (51, 89.5%), with information literacy and reference services receiving response rates of 44 (77.2%) and 43 (75.4%), respectively (see Figure 2).
Carr (2006) concurs with this finding and mentions some areas within libraries that are best suited to telecommuting: acquisitions, reference services, reservations, interlibrary loans, library instruction and cataloguing. For Carr, telecommuting is a viable option for any library in Jamaica. Similarly, information retrieval, cataloguing, collection development and research were found to be effectively performed outside the library building in Azami et al.’s (2018) study.

Opportunities available to librarians

Again, telecommuting was seen to be highly acceptable among academic librarians in Ghana. When asked if they would like to be involved in some form of telecommuting, the majority (51, 89.5%) of the respondents indicated that they were willing to telecommute. This finding affirms earlier studies (Azami et al., 2018; Carr, 2006; Diab-Bahman and Al-Enzi, 2020) that indicate the willingness of staff to be involved in some form of telework. It further indicates that when given the opportunity, employees, including library staff, will be more inclined towards working from home.

On the main motives for wanting to telecommute, the respondents were presented with several options. The topmost reasons indicated by the respondents were flexibility of work hours (46, 80.7%) and the reduced need for travel (45, 78.9%). Other reasons identified were improved quality of work life (32, 56.1%), high volume of work possible (21, 36.8%), easier childcare arrangements (19, 33.3%) and high quality of work possible (19, 33.3%). The least important reasons were the reduced cost of transportation (1, 1.8%) and reduced cost of doing work (1, 1.8%) (see Figure 3). The average time spent commuting was 2 hours 30 minutes daily.

The flexibility of work hours has been cited in numerous studies (Ansong and Boateng, 2018; Bose and Luo, 2011; Kelly and Shoemaker, 2021; Parajuli, 2020). Giving an employee the opportunity to work within a less rigid schedule enables employees to be more critical and analytical due to reduced interruptions and better time management, and, in some instances, allows for extra work to be completed. Additionally, with the increasing rate of mobility in urban areas, the amount of time spent commuting to work is continually climbing. An important finding on why library staff would like to telecommute highlighted by this study is the reduced need for travel. Carr (2006) reports that 100% of the respondents surveyed in Jamaica believed that there would be a huge decrease in their commuting time if they were allowed to telecommute. Similarly, Diab-Bahman and Al-Enzi (2020) reiterate a reduction in the costs of fuel and ultimately travel leading to greater employee satisfaction.

The majority of the respondents (41, 71.9%) also indicated that they would like to telecommute once or twice a week if given the opportunity. Another group of respondents (6, 10.5%) were in favour of telecommuting once a week. Other responses, chosen by one respondent each (1, 1.8%), were once a month, three times a week, as much as allowed, based on work schedule and every day (see Figure 4).

Browne (2018) comments that a study conducted by a Switzerland-based office, IWG, indicated that 70% of professionals telecommuted at least one day a week. Relating to the organization, the respondents were asked whether they believed academic libraries are suitable for telecommuting. There was overwhelming agreement (53, 93%) that academic libraries are currently well positioned to allow some form of telecommuting:
We can serve our patrons without necessarily meeting them face-to-face. Most libraries have invested in digital/electronic resources and have systems that support remote services. Besides, the current tech-savvy users prefer remote services. Telecommuting and working from the office can complement each other to provide seamless and uninterrupted service to our patrons. Libraries are increasingly becoming digital and are making their products and services easily accessible outside campus. Library staff do not necessarily need to be on campus to serve the needs of users.

This finding supports Azami et al.’s (2018) research, which confirms that although telecommuting is seemingly new in librarianship, academic libraries can seamlessly apply it in some parts of their work to help deal with issues relating to budget cuts and restraints on human resources in libraries. A few of the respondents (4, 7%), however, did not believe that academic libraries are well adapted for telecommuting:

We have not yet developed the necessary telecommunication tools.

We don’t have the technology to do such.

We lack the logistics to work from home, e.g. high cost of Internet bandwidth, computer/laptop.

**Challenges**

Another question sought to find out whether the respondents’ libraries allowed some form of telecommuting. The respondents had divided opinions, with 29 (50.9%) indicating some form of telecommuting taking place in their libraries and another 28 (49.1%) not being aware of any form of telecommuting activities. Regarding the probability of management allowing library staff to telecommute, the majority of the respondents (31, 54.4%) believed that management would be willing to allow some form of telework if the option was presented to them:

Yes, if the right policies are in place.

Library management is cognizant of the changing trends in library service provision. They may be more liable to allow some personnel to telecommute.

This is because it will lead to cost-saving and job satisfaction if library management can explain it very well.

However, quite a number (26, 45.6%) disagreed:

Most are conservative. It will require a lot of education for these old professors to buy in.

We advocated it during the COVID-19 period but it was not agreed upon.

Once you are not on campus, you are not seen as working.

The sentiments of the respondents correspond with the assertion by other researchers that employers have difficulty believing that workers are indeed working when they are not being supervised (Beñó, 2021; Felstead and Reuschke, 2020; Harpaz, 2002).
This is, however, not always the case. Felstead and Reuschke (2020) report that the productivity levels of employees who had to work at home during the COVID-19 lockdown were not affected in any way, with 40.9% getting as much work done in June 2020 as they had six months earlier. Linked with the success of telecommuting and its acceptance by both employers and employees is the development and enforcement of well-documented policies that will guide the process. Rajapakshe (2021) emphasizes the use of policies that will guide training on the elimination of the conflict that may arise due to family obligations, and the provision of incentives for employees, and also offer psychological support to telecommuters. Additionally, such policies should detail all of the arrangements pertaining to telecommuting, including who can telecommute and under what circumstances. Baker et al. (2006) echo these suggestions and add that training should be targeted at not only the telecommuting employee but also all employees and their managers to avoid unplanned scenarios.

Regarding the setting in which telecommuting will take place, the respondents (40, 70.2%) further affirmed that they had an adequate infrastructure in place at home should the need arise for them to telecommute. Additionally, even though the majority (30, 52.6%) had children aged 10 or younger, there were adequate mechanisms in place to prevent any form of intrusion by either their children or other external factors. These findings support Rajapakshe’s (2021) study, which states that for telecommuting to be successful, appropriate software and a technological infrastructure, such as a high-speed Internet connection, need to be available. Further, even with the presence of children, adequate measures had been put in place to forestall any form of disturbance, as highlighted by Khan and Hasan (2020).

**Conclusion**

Telecommuting has become more relevant in recent times due to advances in communication and the communication tools that are constantly being developed. Additionally, the impact of the COVID-19 pandemic has left all organizations, including academic libraries, strategizing on how best to keep functioning in the case of an emergency. A rapid digital transformation is currently being experienced in all sectors of the economy, including academic libraries, and they are striving to make their presence felt outside the four walls of the library building. The findings of this study indicate that academic librarians in Ghana are very much aware of teleworking and are ready to telecommute at least once a week. The most significant benefits that telecommuting can offer the Ghanaian academic library system are flexibility in working hours and a reduced amount of time, and ultimately money, spent on travel. The rapid increase in the urban population has placed overwhelming pressure on transport services. Due to the increase in the number of cars and people with cars, lack of urban planning and low capacity of the transport infrastructure, commuters spend long hours travelling to and from work, which affects their productivity. The increasing cost of fuel is impacting workers, and spending some time at home working will help relieve already overburdened workers. Additionally, having staff do some of their work at home on certain days may be more motivating and reduce the rate of absenteeism and costs for the employer associated with a worker being physically present in an office.

Telecommuting in Ghana’s academic libraries presents a cost-effective solution to addressing staff shortages and improving service delivery. By leveraging technology and implementing telecommuting policies, academic libraries can expand their reach and provide more convenient and accessible services to their users. Telecommuting is a workable solution but it will require that both employers and employees fully understand the process and be willing to participate. Those individuals who are to be involved must go through a careful selection process to make sure that they are able to work with little or no supervision. Ultimately, telecommuting in Ghana’s academic libraries is a step forward in modernizing and improving the library system, and has the potential to significantly benefit both library staff and users. As long as the rules are followed, telecommuting will succeed and be beneficial for the entire Ghanaian academic library system. A workable solution in Ghana will set a benchmark for other academic libraries to emulate, and will be an advantage within the entire university environment, especially in terms of operating expenses. Overall, it will aid in promoting a greener and safer environment with a reduction in the gasses emitted by moving vehicles daily.

**Recommendations**

In order to realize the full benefits of telecommuting, the following measures should be put in place:

- **Development of a telecommuting policy:** the development of a detailed policy guiding both employers and employees will help
communicate and address any concerns that may arise at any point in time. Issues regarding who qualifies to telecommute, security and equipment use, technology and what is expected of a telecommuting employee should be spelt out to help eliminate issues of trust among both employers and employees.

- **Investments in technology**: solid investment in appropriate technology, such as computers, fast and reliable Internet connections and a network infrastructure, will be useful in ensuring the success of telecommuting. This will provide staff with all the tools that are needed to ensure productivity and efficiency, and reduce the possibility of some staff making excuses for not doing their work. Additionally, academic libraries need to be well structured to meet the needs of their users outside the library building. Digitization efforts need to be encouraged and also expanded to support more library services and products that will reach a broader range of people.

- **Staff training**: ongoing professional training for all staff will help ensure the full benefits of telecommuting. Continuous training, not just one-off sessions, will help to keep staff abreast of new technologies and clarify any concerns that may arise on a daily basis. It will provide an avenue for staff to share their experiences, any challenges they have faced, and how they have overcome these challenges. The training may also focus on the use of technologies, as well as topical areas that may be identified as peculiar to a particular library.

- **Monitoring of progress**: the regular monitoring of the progress of staff who telecommute is essential to ensure that the set goals and objectives are met in the same way as if they were physically present in the office. A detailed monitoring and evaluation assessment mechanism should be designed to keep track of staff based on their specific roles and responsibilities. Additionally, supervisors can institute regular checks and feedback mechanisms that will enable them have real-time information about the work being done.

- **User surveys**: surveys will be useful in determining the success, or otherwise, of telecommuting. It is important to get feedback from users who benefit from the areas of library work that are telecommuted to help address any shortfalls and improve services. Surveys will also be useful in identifying products and services that will most likely be accepted and patronized by users, thereby ensuring value for money.

**Suggestions for future research**

Future studies could focus on assessing the effects of telecommuting on staff well-being with a focus on stress levels, the work–life balance and general job satisfaction, and assessing the sustainability of telecommuting in the Ghanaian academic library landscape.

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Wilhemina Odarkor Ofori is the acting librarian at Heritage Christian University College, a private university in Accra, Ghana. Master of Philosophy. She is currently pursuing a PhD in Information Science at the University of South Africa. She represents Heritage on the Governing Council of the Consortium of Academic and Research Libraries, Ghana, where she serves on a number of committees. Wilhemina is also a member of the Ghana Library Association. Her research interests include library marketing, digitization in libraries, information-seeking behaviour and library trends.
The current state of academic librarians’ continuing professional development and the roles of continuing professional development providers in Thailand

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Abstract
This research explored the current state of the continuing professional development of Thai academic librarians and the roles of continuing professional development providers, employing a mixed-methods approach. An online questionnaire was completed by 243 Thai academic librarians and in-depth interviews were conducted with 20 library directors and deputy directors. The quantitative data was analysed using descriptive analysis, while the qualitative data was examined through thematic analysis. The research found that academic librarians recognized the importance of participating in continuing professional development activities and exhibited a preference for online continuing professional development, with ‘in-house’ providers and academic library networks assuming significant roles. The study recommends focusing on information technology skills and English proficiency. Concise and dynamic guidance is offered for academic libraries and continuing professional development providers to reshape continuing professional development activities to post-pandemic dynamics, based on academic librarians’ needs, and align their offerings with contemporary academic library challenges and trends, better suiting Thailand’s evolving educational context.

Keywords
Continuing professional development, continuing professional development providers, academic librarians, academic libraries, Thailand

Introduction
The rapid advancements in technology and the new ecology of education present challenges to higher education institutions and academics across the world. The trends towards online or hybrid teaching and learning appear to be lingering following the COVID-19 pandemic, and they seem to be here to stay for the foreseeable future (Abdrasheva et al., 2022; Farliana et al., 2023; Rapanta et al., 2021; UNESCO, 2020). Consequently, higher education institutions need to adapt and adjust to this rapidly
changing environment in order to remain relevant in the digital age. These pressing challenges have led to difficulties for academic libraries and librarians in terms of keeping abreast with developments in the field of library and information science (LIS) that were partly instigated by the recent pandemic (Ocholla, 2021). As a result, educational institutions have been required to reconsider their mission and methods of transferring knowledge, and also take into account the roles of academic libraries and professional librarians in the process. Simultaneously, academic librarians and staff have been required to acquire new knowledge and competencies in order to manage their tasks and fulfil stakeholders’ expectations (Jayasuriya and Majid, 2022).

Continuing professional development (CPD) is compulsory and crucial for academic librarians, as well as for other professionals. It is enshrined in the professional code of conduct and often required for professional advancement. CPD offers academic librarians new knowledge and competencies, and provides the possibility of making meaningful contributions to their respective teams, workplace and community (Gunasekera, 2021). Furthermore, CPD is a vital tool to maintain and advance individuals’ knowledge and the required skills to stay relevant, keep pace with current LIS standards and cope with ever-changing trends in the LIS profession. It is noteworthy that CPD training not only affects the personal development of individuals in terms of gaining more skills for the purposes of career advancement, but also enhances the competency, quality and productivity of their respective libraries and universities (Brine et al., 2022; Namaganda, 2020).

Although CPD is essential for professional development and improving the quality of libraries’ service offerings, librarians around the world face difficulties accessing CPD opportunities. For instance, in Botswana, some academic librarians have never participated in any type of training course to advance their knowledge and skills (Mooko and Oladokun, 2021). Likewise, academic librarians in Uganda face CPD-related constraints due to inadequate support from their employers, insufficient funding, heavy workloads and a general lack of information regarding available CPD activities (Namaganda, 2019). Meanwhile, most academic librarians in Indonesia and Sri Lanka appear to regularly participate in CPD activities. However, despite the opportunity to take part in CPD-related courses, these librarians still experience limitations in terms of upgrading their skills due to the high costs of information technology training, time constraints and a lack of financial support from their employers (Gunasekera, 2021; Maesaroh, 2012).

In Thailand, limited research has been done on the state of CPD for academic librarians. There has been only one study, conducted in 2015, which focused on CPD programmes for academic librarians affiliated with Rajabhat universities across the country (Kaewkongsup et al., 2016). This research revealed that academic librarians were indeed aware of the significance of CPD activities and their benefits. The research also highlighted that these academic librarians enjoyed both on- and off-site training and seminars, and that the English language was a significant barrier to them taking full advantage of the available CPD activities. Other CPD studies in Thailand relate to specific academic libraries.

As suggested by Shonhe (2020), extensive research in the area of CPD is required, as it is crucial for upgrading employees’ skills and enhancing the effectiveness and productivity of customer services in libraries. Therefore, this research attempts to investigate the current state of CPD as it relates to Thai academic librarians and the roles of CPD providers in enhancing their service offerings. Furthermore, this study aims to provide guidelines to assist universities and their directors with their decision-making processes as they pertain to CPD programmes. In particular, the study attempts to offer recommendations for improving the planning, design, development and implementation of CPD activities and programmes that are appropriate in a Thai context. Finally, the recommendations presented in this study aim to help all stakeholders to better cope with the changes, challenges and paradigm shift in the profession with the objective of increasing job satisfaction and competence, and aiding career advancement and productivity in this new ecology of education in the post-pandemic era.

**Research objectives**

The research has two objectives: (1) to explore the current state of CPD and the need for CPD activities to develop Thai academic librarians’ competencies and (2) to investigate the roles of CPD providers in developing the competencies of Thai academic librarians.

**Literature review**

CPD plays an important role in human resource management and in the LIS profession. CPD is a general mandate for professional associations, and it is required by the code of conduct or code of ethics in organizations’ charters. CPD programmes help to...
ensure that academic librarians provide high-quality customer services that meet the expectations of their customers.

There are a number of definitions for CPD that have been proposed, altered, revised, elaborated and extended, and have evolved, over time – for example, continuing professional education, in-service training, professional education, continuing education and professional development (Saleem and Ashiq, 2020). CPD, as defined by IFLA, is the cycle pertaining to the stages of employees’ development, which includes planning, acting and evaluating. This is a critical process to ensure that librarians and LIS professionals keep pace with changes in the industry and achieve their personal and professional goals (Varlejs et al., 2016).

CPD programmes have become compulsory in the LIS profession, and academic librarians are well aware of the importance of CPD activities (Moonasar and Underwood, 2018). Academic librarians engage in CPD in multiple ways, both formal and informal – for example, through in-house training, coaching and mentoring systems, conferences, seminars, workshops, short courses, communities of practice or skill portfolios (Chukwusa, 2021; Gunasekera, 2021). Librarians with a preference for participating in traditional activities, focusing on conferences, seminars, and workshops, constitute the most dominant portion of the overall participants (Mooko and Oladokun, 2021). Other non-traditional activities include online courses and self-paced learning (Namaganda, 2019), as well as training provided through social networking platforms such as Facebook, Twitter and Instagram, with the intention of having professionals meet in cyberspace to exchange knowledge and skills that are aligned with their profession (Aslam, 2019).

The adoption of e-learning programmes for CPD among library professionals has significantly increased, driven by evolving workplace environments, technological advancements and the changing landscape of libraries (Shahzad et al., 2023). The expansion of online learning, including CPD for LIS professionals, has become a necessity and the new norm in the member countries of the Association of Southeast Asian Nations, and notably Thailand, with online programmes playing a pivotal role in enhancing professional expertise (Sacchanand, 2014, 2021). Policymakers are encouraged to establish sustainable policies to support the development of e-learning programmes, ultimately leading to value-added outcomes for university library staff.

The IFLA guidelines propose that CPD programmes be designed ‘to support the employing organization’s goals for excellent service’ (IFLA, 2016: 2). And the goal of employees should be to learn new skills to contribute to their profession’s development and improvement, and to fulfil their organization’s objectives (Varlejs et al., 2016). CPD should be associated with individuals’ need to include ‘critical thinking’ in their practice, which is based on collaborative environments that endorse sustained learning and active experimentation (Namaganda, 2019). Planning is one of the fundamental principles of management, and its importance for effective CPD should not be overlooked (Adanu, 2007). Librarians should develop individualized learning plans to help them monitor and enhance their current and future career prospects within the profession (Oladokun and Mooko, 2023), and CPD programmes should also be aligned with librarians’ needs and career paths.

Several studies have investigated the topics that should be included in CPD programmes. These studies agree that there are a number of popular topics that CPD programmes should incorporate, including information and communications technology (ICT) skills, communication skills and research support skills, which are all related to academic librarians’ tasks. For example, librarians in Nigeria claimed that topics such as effective communication skills, technical skills, computer literacy and information-seeking skills ought to be included in their CPD programmes (Chukwusa, 2021). Similarly, librarians in Sri Lanka preferred topics relating to open access and digital repositories, writing papers, bibliometrics and conducting reference interviews to be part of their CPD programmes (Gunasekera, 2021). Moreover, Arua (2019) suggested that academic librarians should make a deliberate attempt to use information technology and innovations as much as possible. They should attend various CPD activities and courses, and relevant events, as different CPD programmes offer different competencies, knowledge and skills. Rafiq et al. (2017) noted that CPD programmes should be provided based on the needs of the audience.

**CPD providers**

CPD activities can be provided by many actors, such as employers, professional associations, higher education institutions and government or other organizations, as well as the information industry and entrepreneurs. The role of employers in CPD can take various forms. In-house programmes are the most popular. Others include employers’ support in terms of ‘paid time to attend’ and ‘budget to attend’ training and/or conferences (Gunasekera, 2021). A supportive library environment and a clear employer CPD policy motivate librarians to engage in CPD programmes.
In particular, employers have a significant role to play in encouraging and motivating their staff to participate in CPD activities, as they have the ability and power to create interaction and networks between colleagues nationally and internationally (Moonasar and Underwood, 2018). Therefore, a supportive employer is critical for librarians’ professional development. As such, Adanu (2007) noted that the involvement of professional librarians in CPD should be the shared or dual responsibility of both the library and individuals.

As for the CPD programmes offered through libraries and professional associations, they are provided in the form of seminars, conferences and workshops to enhance the hard and soft skills that are essential for the promotion and advancement of LIS professionals (Ahmad et al., 2019). National, regional and international LIS libraries and professional associations are thus important CPD providers. Among these, IFLA, the oldest and largest international LIS association, plays a remarkable role in offering various activities to promote opportunities to gain skills and develop capabilities at both the individual and national levels. Moreover, IFLA supports professional growth and extends the opportunities for librarians to connect with other professionals in the same area of interest. Furthermore, it has developed diverse professional networks and activities, such as annual conferences and a webinar.

CPD is the core focus for library associations – for example, the American Library Association, Chartered Institute of Library and Information Professionals, and Australian Library and Information Association conduct a series of CPD events, activities and programmes through their CPD sections or affiliated associations or groups. In particular, the Association of College and Research Libraries (2017), the largest division of the American Library Association, develops programmes, products and services to help librarians who work with academics and research libraries. In South Africa, academic librarians stated that the Library and Information Association of South Africa had a potentially important role to play in promoting CPD (Moonasar and Underwood, 2018). In Sri Lanka, most librarians realized the value of obtaining membership of the Sri Lanka Library Association, which provided them with better access to resources, news and professional networks.

LIS schools and institutions, as well as LIS educators, have a vital role to play in formal training in librarianship. They offer LIS programmes at both the undergraduate and graduate levels, and encourage ongoing learning for academic librarians. Furthermore, LIS graduate programmes play an important role in generating research in the field of LIS. The study by Rafiq et al. (2017) found that library schools played a critical role in the continuing education of LIS professionals in Pakistan. This was due to the fact that LIS schools have well-educated faculty members with strong coordination capabilities, and the curricula and infrastructure to allow LIS students to align themselves with market needs and future trends.

As LIS is an interdisciplinary area, academic libraries are naturally involved with a wider scope of knowledge. Consequently, CPD providers are not limited to the field of LIS, but also include providers in ICT and the education sector, and library vendors. The providers are crucial to the success of CPD, which can be highlighted through collaboration and collaborative management, and activities among the LIS professionals. As such, the findings of Moonasar and Underwood (2018) and Arua et al. (2017) confirm that professionals, employers, institutions and library information associations should work together to encourage and promote CPD activities in order to build valuable programmes and activities that are suitable for LIS professionals.

Methodology
This study employed an explanatory sequential design using mixed methods to investigate the current state of CPD programmes and Thai academic librarians’ need for them. The research then focused on the roles of CPD providers for academic librarians in Thailand. In the initial stage, online questionnaires were used to explore the current state of CPD programmes and the participants’ need for CPD among 243 librarians in public and private universities across the country. The sampling methodology employed in this context adhered to the principles of simple random sampling, ensuring that each librarian within the target population had an equal and independent probability of being selected for participation in the survey. The questionnaires were developed and enriched using insights derived from the study ‘CPD for Academic Librarians in Selected Asian Countries’ (De Alwis Jayasuriya et al., 2022). This study was initially carried out in the Republic of Maldives between 2019 and 2020. Furthermore, the questionnaires underwent a rigorous validation process and were reviewed by three experts in the field of LIS, thereby affirming the validity of the questions through the index of item-objective congruence.

In the process, document analysis was used to review, evaluate and interpret relevant documents and elicit sufficient details regarding the roles of CPD providers in developing Thai academic librarians.
Thereafter, in-depth interviews were conducted with 20 academic library directors and deputy directors in order to gain a broader perspective on the roles of CPD providers. This study sought to address inquiries regarding the roles of CPD providers in the professional development of academic librarians within their respective universities. To collect data, a two-phase interview approach was implemented.

The initial data collection stage occurred during the constraints posed by the COVID-19 pandemic, primarily in the years leading up to 2022. During this phase, interviews were conducted with the participants using phone calls and the Line application, which were chosen as suitable virtual communication channels that facilitated real-time audio recording. Subsequently, in the second phase, with an improvement in the COVID-19 situation post-2022, the interviews with the participants transitioned to an online format, facilitated by an interview form distributed via Google Forms. This change in the data collection method enabled a more comprehensive and flexible approach to acquiring responses and insights, while also considering the safety and convenience of the participants.

The sampling strategy employed for this part of the study adhered to the snowball sampling method. This technique was employed to harness the expertise and perspectives of those deeply entrenched in the realm of CPD provisioning, thereby affording a more comprehensive and insightful examination of this facet of professional development within academic library leadership.

The research methodology employed in this study is characterized by a mixed-methods approach, which integrates both quantitative and qualitative data analysis techniques. For the quantitative analysis, a descriptive analysis was initially applied to gain insights into the present conditions and CPD requirements of Thai academic librarians. This phase involved the computation of descriptive statistics, including frequencies, percentages and means. These statistical measures were instrumental in quantifying and summarizing the survey data, providing a numerical snapshot of the state of CPD needs among the target population.

With regard to the qualitative analysis, following the quantitative phase, a thematic analysis was conducted to explore and categorize the roles of CPD providers. Here, the focus shifted from numerical data to textual content. The qualitative approach allowed for the identification and grouping of CPD provider roles into two overarching themes: personal competency development and professional competency development. This thematic analysis was essential for providing a deeper, context-rich understanding of the roles that CPD providers play in enhancing the personal and professional competencies of academic librarians in the Thai context.

By combining quantitative and qualitative methods, this study sought to offer a comprehensive and nuanced exploration of CPD needs and provider roles among Thai academic librarians. The quantitative data provided a statistical foundation, while the qualitative analysis delved into the intricacies and nuances of the roles played by CPD providers. This mixed-methods approach enabled a more robust understanding of the research subject, adding depth and context to the findings, which are further elaborated below.

## Results

The findings of this study are divided into two main parts: (1) the current state of CPD for Thai academic librarians and (2) the roles of CPD providers in developing the skills of academic librarians in Thailand.

### Current state of CPD

The first set of findings can be further divided into the following subtopics: background of the academic librarians; academic librarians’ participation in CPD programmes during 2018–2022; academic librarians’ perceptions of CPD programmes; barriers preventing academic librarians from participating in CPD; and academic librarians’ needs in terms of CPD programmes.

#### Background of the academic librarians.

In this study, the population comprised 243 academic librarians from public universities, public autonomous universities, Rajabhat universities and private universities across the nation. Public autonomous universities are government-funded higher education institutions that have greater independence with regard to their curriculum, admissions and administrative decisions compared to traditional public universities. The distinction between public universities and public autonomous universities lies in the degree of control they have over their academic and administrative affairs. Public autonomous universities have more flexibility and autonomy, while public universities typically operate with greater government oversight and regulation (Mumbansao, 2022). Rajabhat universities were established to provide teacher training and education programmes with an emphasis on preparing educators for schools and educational institutions. However, Rajabhat universities have evolved over time, and their specific programmes and offerings...
may vary between different institutions. They continue to play a significant role in the education and development of teachers and other professionals in Thailand (Quigley and Kanjananiyot, 2022). It is notable that a significant number of these academic librarians were affiliated with institutions in small cities (92, 37.86%), with a slightly smaller representation in major cities (79, 32.51%) and the remainder in Bangkok (72, 29.63%).

As is evident from Table 1, the majority of the academic librarians in this study were female (217, 89.30%) and held a Bachelor’s (113, 46.50%) or Master’s (112, 46.09%) degree in LIS. The academic librarians in this study commonly worked in public autonomous universities (142, 58.44%), followed by Rajabhat universities (65, 26.75%) and public universities (20, 8.23%).

A significant number of the participants worked as practitioners (163, 67.08%), while others held managerial positions (94, 38.68%). Most of the participants were employed at the director or deputy director level (40, 16.46%), followed by the division head (29, 11.93%) and head (25, 10.29%) levels. Moreover, the majority of the academic librarians were responsible for library services (132, 54.32%), reference services (129, 53.09%), classification and cataloging (109, 44.86%), and information literacy instructors (89, 36.63%), respectively.

In terms of work experience, the majority of the participants had offered 11–15 years (57, 23.46%) of library service. Others had worked in the field for more than 25 years (56, 23.05%). In respect of professional membership, most of the librarians did not have a professional affiliation with any organization (168, 69.14%). There were, however, 62 (25.51%) librarians who were members of the Thai Library Association, while the rest were members of other associations or clubs (13, 5.35%).

Table 1. Background of the academic librarians (N = 243).

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*Multiple responses allowed.

Academic librarians’ participation in CPD programmes during 2018–2022. It appears that, during 2018–2022, most academic librarians participated in the CPD programmes (162, 67.00%) that were offered by their libraries. Notably, only half of these participants joined in with the activities more than three times a year (91, 56.17%).

Additionally, the study revealed that almost half of the academic librarians (45.06%) in this research participated in CPD programmes offered by their affiliated libraries or the Provincial University Library Network (PULINET), with a similar number and percentage of participants for each CPD provider. Meanwhile, the smallest number of participants (4.94%) engaged in programmes hosted by the Thai Library Association. It is worth noting that PULINET, a library network system in Thailand that primarily serves the academic libraries of provincial universities, plays a crucial role in fostering resource sharing, technology support and cooperation among these libraries. This collaboration enhances the accessibility of library materials and services for their respective institutions and allows academic libraries to work together on collection development, digital initiatives and other library-related activities to better serve the educational and research needs of provincial
universities throughout Thailand (Provincial University Library Network, 2023).

For those librarians who participated in CPD events one to three times a year, the majority joined programmes that were hosted by PULINET (142, 87.65%), followed by the Thai Library Association (121, 74.69%), their affiliated libraries, library vendors and service suppliers, such as publishers and database providers (111, 68.52%), and the Thai National Library (93, 57.41%).

Most of the academic librarians in this study had heard about CPD programmes through the official websites of the hosting organizations (148, 60.91%), followed by Facebook (141, 58.02%) and invitation letters (139, 57.20%). A large majority of the academic librarians were of the view that CPD programmes were very important (155, 64.00%), followed by important (71, 29.00%) and slightly important (17, 7.00%).

In a comprehensive analysis of the opportunities for academic librarians to engage in CPD programmes provided by various sources, including in-house providers, academic library networks and LIS schools, carried out with 2355 multiple responses, this study has produced intriguing insights. Among the academic librarians who attended CPD programmes more than three times a year, the majority were predominantly affiliated with institutions in Bangkok (133, 5.65%), closely followed by those in small cities (124, 5.27%) and large cities (123, 5.22%). In contrast, the academic librarians who attended CPD programmes one to three times a year were primarily linked to institutions in small cities (342, 14.52%), with those in Bangkok (285, 12.10%) and large cities (282, 11.97%) close behind. Interestingly, a substantial number of the librarians had never attended CPD programmes, with the highest representation belonging to institutions in small cities (418, 17.75%), followed by those in Bangkok (342, 14.52%) and large cities (306, 12.99%). These findings provide valuable insights into the distribution of CPD participation among academic librarians, considering various types of institutions and geographical locations.

**Academic librarians’ perceptions of CPD programmes.**

The study indicated that the motivating factors for participating in CPD programmes for the academic librarians included personal and career development and for the purpose of gaining knowledge.

In terms of personal development, the participants commented that one motivation for participating in CPD programmes was their general interest in the subject matter (164, 67.49%). Half of the participants (125, 51.44%) stated that joining a programme would help boost their self-confidence. Meanwhile, 102 librarians (41.98%) remarked that joining a programme encouraged them to achieve their goals. In regard to career development, a large majority of the librarians (205, 84.36%) indicated that participating in such programmes would increase and update their knowledge base and skills. Others said that these programmes would allow them to work more effectively (182, 74.90%) and improve their productivity at work (164, 67.49%).

As for gaining knowledge and upgrading skills, a significant number of the participants (215, 88.48%) attested that these programmes were indeed beneficial in respect of learning new skills and gaining knowledge. Over two hundred of the librarians (212, 87.24%) commented that attending these programmes would enrich their professional knowledge, while 199(81.89%) indicated that programmes related to new technologies and trends would be extremely advantageous and relevant for their profession. Moreover, 195 (80.25%) of the librarians claimed that these programmes were indeed important for their professional development.

**Barriers preventing academic librarians from participating in CPD.** The participants stated that there were a number of barriers that hindered their participation in CPD programmes – namely, personal reasons, challenges regarding online instruction and learning, the nature of the hosting organizations, and the high cost of joining the programmes making it difficult for their affiliated libraries to provide support.

The majority of the participants claimed that a number of ‘personal’ factors prevented them from participating in CPD programmes, including their routine tasks (127, 52.27%), obstacles relating to travel (116, 47.47%) and the high costs involved with participation (89, 36.63%). As stated above, another barrier for the participants in attending CPD programmes was the challenges related to online instruction and learning. The complaints about this channel of instruction mainly pertained to technical issues – for instance, unstable Internet connections (116, 47.74%), followed by inadequate online learning skills (34, 13.99%) and insufficient infrastructure to support online learning in their organizations (7, 2.88%). Moreover, a small number of the participants argued that the low quality of the hardware and software available for their purposes further prevented them from participating in CPD activities (7, 2.88%).

A further challenge regarding participation in CPD was the hosting organizations. Nearly half of the
librarians (98, 40.33%) noted that the high cost of registration fees played an important role in their decision as to whether to participate in such programmes, and repetitive and outdated topics were mentioned as a factor by others (72, 29.63%). Finally, the participants also stated that their affiliated libraries did not have sufficient funds to allow them to attend the programmes offered (76, 31.28%). Others attested that they failed to attend CPD activities due to a shortage of staff to cover their absence (68, 27.98%).

Academic librarians’ needs in terms of CPD programmes.

The study found that the participants expected to gain both personal and professional competencies by participating in CPD programmes. Table 2 outlines these expectations.

With regard to personal competencies, a significant number of the academic librarians (148, 60.90%) underscored the significance and importance of gaining the competencies required in the area of patron services. This was closely followed by communication skills and critical thinking skills (both 147, 60.49%). Developing other personal competencies – such as mentoring and consultation, project management, conflict management and negotiation skills – was also of significant interest to the participants.

With regard to professional competencies, programmes offering information technology skills were found to be the most needed among the librarians (158, 65.02%), followed by programmes focusing on information literacy and user education (141, 58.02%), and digital literacy (138, 56.80%). Other professional competencies – including Library programmes, and Information resource development and management (all 134, 55.14%). Meanwhile, the educational quality assurance, and academic communication and practice (all 138, 56.79%) – were also noted as highly needs. Significantly, all of the listed professional competencies were deemed necessary by more than half of the respondents.

### Table 2. Academic librarians’ needs in CPD programmes (N = 243).

<table>
<thead>
<tr>
<th>Needs</th>
<th>n</th>
<th>%</th>
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<tbody>
<tr>
<td><strong>Personal competencies</strong></td>
<td></td>
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<tr>
<td><strong>Highest priority needs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patron services</td>
<td>148</td>
<td>60.90</td>
</tr>
<tr>
<td>Communication skills</td>
<td>147</td>
<td>60.49</td>
</tr>
<tr>
<td>Personal communication</td>
<td>140</td>
<td>57.61</td>
</tr>
<tr>
<td>Teamwork</td>
<td>140</td>
<td>57.61</td>
</tr>
<tr>
<td>Decision-making and problem-solving</td>
<td>137</td>
<td>56.37</td>
</tr>
<tr>
<td>Presentation skills</td>
<td>130</td>
<td>53.49</td>
</tr>
<tr>
<td><strong>High priority needs</strong></td>
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<tr>
<td>Critical thinking</td>
<td>147</td>
<td>60.49</td>
</tr>
<tr>
<td>Mentoring and consultation</td>
<td>144</td>
<td>59.25</td>
</tr>
<tr>
<td>Project management</td>
<td>143</td>
<td>58.84</td>
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<tr>
<td>Conflict management</td>
<td>139</td>
<td>57.20</td>
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<tr>
<td>Negotiation</td>
<td>139</td>
<td>57.20</td>
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<tr>
<td>Teaching</td>
<td>138</td>
<td>56.79</td>
</tr>
<tr>
<td><strong>Professional competencies</strong></td>
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<tr>
<td><strong>Highest priority needs</strong></td>
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<tr>
<td>Information technology skills (fluency in using digital devices,</td>
<td>158</td>
<td>65.02</td>
</tr>
<tr>
<td>applications and services</td>
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<tr>
<td>Information literacy and user education</td>
<td>141</td>
<td>58.02</td>
</tr>
<tr>
<td>Digital literacy</td>
<td>138</td>
<td>56.80</td>
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<tr>
<td>Library programmes (library automation, digital repository systems,</td>
<td>134</td>
<td>55.14</td>
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<tr>
<td>learning management systems)</td>
<td></td>
<td></td>
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<tr>
<td>Information resource development and management</td>
<td>134</td>
<td>55.14</td>
</tr>
<tr>
<td><strong>High priority needs</strong></td>
<td></td>
<td></td>
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<tr>
<td>Educational quality assurance</td>
<td>138</td>
<td>56.79</td>
</tr>
<tr>
<td>Academic communication and practice</td>
<td>138</td>
<td>56.79</td>
</tr>
<tr>
<td>Digital preservation, information management and text mining</td>
<td>137</td>
<td>56.38</td>
</tr>
<tr>
<td>Research and assessment</td>
<td>134</td>
<td>55.14</td>
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<tr>
<td>Evidence-based practice in libraries</td>
<td>132</td>
<td>54.32</td>
</tr>
<tr>
<td>Data science and visualization</td>
<td>131</td>
<td>53.90</td>
</tr>
</tbody>
</table>
Table 3 illustrates that academic library networks (129, 53.08%) were the most sought-after CPD providers for the academic librarians, followed by the Thai Library Association (112, 46.09%), in-house providers (96, 39.50%) and LIS schools (92, 37.86%). CPD programmes offered by the Thai National Library ranked lower and proved to be less in demand (79, 32.51%).

In terms of the mode of delivery of CPD programmes, the most demanded mode appears to have been online learning in both short courses and CPD programmes via virtual platforms (106, 43.62%), followed by online training (short courses or continuing programmes) (102, 41.97%) and online seminars (101, 41.56%). The participants ranked face-to-face learning as their least preferred mode of knowledge transfer (72, 29.63%).

### Roles of CPD providers

The results of the interviews with the 20 directors and deputy directors of academic libraries in Thailand highlighted the roles played by five types of CPD provider – in-house providers, academic library networks, the Thai Library Association, LIS schools and other CPD providers. The roles of CPD providers in developing the skills of academic librarians were grouped into two overarching themes – namely, personal competency development and professional competency development, which are further elaborated below (see Table 4).

### Personal competency development

The key points concerning personal competency development reveal that the CPD activities offered by in-house providers are well aligned with the university’s mission. These CPD activities adopt a diverse and holistic approach, providing customization options and fostering comprehensive professional development. They also expand the scope of expertise, enhance technical skills, utilize online platforms and contribute to the enhancement of digital literacy.

On the other hand, the CPD activities organized by academic library networks are noteworthy for the inclusion of PULINET’s annual library conference and their emphasis on promoting idea sharing and instilling a sense of responsibility among the participants. In addition, LIS schools play a pivotal role by delivering formal education and short courses. They offer a wide range of courses that encompass diverse subjects and fields. Through these educational initiatives, they actively contribute to the development of both personal and professional skills among their students.

### Professional competency development

The key points related to professional competency development emphasize that the CPD activities offered by in-house providers not only entail variability in roles and responsibilities, but also involve a collaborative effort shared by both libraries and universities. Furthermore, these CPD activities are characterized by customization and cost-effectiveness.

In the realm of academic library networks, several key points highlight the importance of PULINET’s national library conference, which is held on an annual basis. The conference provides a valuable platform for academic librarians, offering opportunities for publication and professional advancement within the CPD sphere. This event not only fosters knowledge exchange, but also serves as a catalyst for career growth and scholarly contributions within the academic library community.

On the other hand, it is imperative to consider the role of LIS schools. Here, there must be recognition of the role played by academic journals published by LIS schools, the CPD activities facilitated by these institutions, and the broader function they serve in educating and training LIS professionals. Within the Thai Library Association, there are two notable offerings. The Association’s annual national conference is a cornerstone event, which is complemented by the presence of eight affiliated groups, each catering to the specific and specialized needs of their members. Finally, other CPD providers are a source of diverse opportunities, offering contemporary and relevant...
knowledge that is integral to the higher education landscape.

**Discussion**

*Current state of CPD for Thai academic librarians and their needs*

The results of this study revealed that academic librarians recognize the importance of participating in ongoing professional development activities. They exhibit a strong motivation to acquire new knowledge, enhance their competencies and gain valuable experience, reflecting a trend observed with academic librarians worldwide. This finding is consistent with the research conducted by Moonasar and Underwood (2018), emphasizing the high regard that academic librarians have for CPD activities. In parallel, IFLA (2020) advocates for information professionals to elevate their awareness and expertise through the continual development of their knowledge and skills. This aligns with the assertions made by Jayasuriya and Majid (2022), who emphasize the essential role of academic librarians and staff in acquiring new knowledge and competencies to effectively manage their responsibilities and meet the expectations of stakeholders.

Namaganda’s (2020) work corroborates the multifaceted impact of CPD, not only on individual professional growth and career advancement but also on the overall competency, quality, and productivity of libraries and universities. Brine et al. (2022) further emphasize the pivotal role of CPD as a fundamental component for all involved in the learning and development process, encompassing individual learners, employers, professional associations, LIS educators and training providers. As a result, academic librarians must harness innovative methodologies and accessible modes of CPD to keep pace with the evolving landscape of their field (Arua, 2019). It is increasingly imperative for individuals to assume proactive responsibility for their own professional development (Jayasuriya et al., 2022).

**Table 4. Roles of CPD providers in developing the skills of academic librarians in Thailand.**

<table>
<thead>
<tr>
<th>Themes</th>
<th>CPD providers</th>
<th>Key points</th>
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<tbody>
<tr>
<td>Personal competency development</td>
<td>In-house providers</td>
<td>Alignment with university mission</td>
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<td></td>
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<td>Diversity of offerings</td>
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<td>Holistic approach</td>
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<td>Customization</td>
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<td>Comprehensive professional development</td>
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<td>Broadened scope</td>
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<td>Technical skill improvement</td>
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<td>Online platforms</td>
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<td>Digital literacy enhancement</td>
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<td></td>
<td>Academic library networks</td>
<td>PULINET’s annual library conference</td>
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<td></td>
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<td>Idea sharing and responsibility</td>
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<td></td>
<td>LIS schools</td>
<td>Formal education and short courses</td>
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<td>Diverse course offerings</td>
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<td></td>
<td></td>
<td>Development of personal and professional skills</td>
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<td>Professional competency</td>
<td>In-house providers</td>
<td>Variability in roles and responsibilities</td>
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<td>development</td>
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<td>Joint responsibility of libraries and universities</td>
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<td></td>
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<td>Customized CPD activities</td>
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<td></td>
<td>Academic library networks</td>
<td>PULINET’s annual library conference</td>
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<td>Publication opportunities</td>
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<td>Professional advancement</td>
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<td></td>
<td>LIS schools</td>
<td>Publication of academic journals</td>
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<td></td>
<td></td>
<td>CPD activities</td>
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<td></td>
<td>Thai Library Association</td>
<td>Annual conference</td>
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<td></td>
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<td>Eight affiliated groups</td>
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<tr>
<td></td>
<td>Other CPD providers</td>
<td>Diverse opportunities</td>
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<td></td>
<td></td>
<td>Contemporary and relevant</td>
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<td>Knowledge</td>
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<td>Integral to higher education</td>
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This study further highlighted the notion that Thai academic librarians are enthusiastic about CPD activities, especially as they relate to ICT competencies and customer service. The majority of the participants in this study were responsible for library services (132, 54.32%), reference services (129, 53.09%) and teaching or instructional activities (89, 36.63%), which makes ICT and customer-service-related courses even more critical. It is important to reiterate that the roles of academic librarians, as teachers or instructors, have changed dramatically due to disruptive technologies and innovations, and as a result of transformations in learning environments and users’ behaviour (IFLA, 2020). The necessity for academic librarians to work diligently, acquire additional skills and take on new responsibilities is underscored by current demands. This requirement implies that librarians must commit to bridging skill gaps and embracing a proactive learning approach, whether through self-directed efforts or library-organized CPD activities (Oladokun and Mooko, 2023). This imperative aligns with Appleton’s (2018) perspective, emphasizing the incorporation of pertinent trends and emerging subjects within CPD programmes. Given the rapid technological changes, innovations and emergence of new fields, academic librarians are compelled to remain agile and adaptable, constantly enhancing their knowledge and competencies. Gunasekera (2021) further reinforces this viewpoint, highlighting the significance of CPD programmes that focus on both current and future skills development for academic librarians. Additionally, librarians must upskill and expand their capabilities to address the requirements not embedded in their current roles.

**Teaching and instructional roles**

Teaching and instructional activities have challenged the traditional roles of academic librarians. The findings of this study revealed that information literacy and users’ education are two required professional competencies in the field. This is supported by several literature reviews. For instance, according to the Association of College and Research Libraries (2017) in their publication ‘Roles and Strengths of Teaching Librarians,’ it is noted that teaching librarians serve students in roles resembling those of a coach, guide, or mentor. This involves assisting students to derive information from complex ecosystems at different stages of their personal and cognitive development. This significance became more pronounced during the COVID-19 pandemic, which shifted online learning into the norm. Consequently, a crucial emerging responsibility for academic librarians is to support online activities and courses. Steele (2021) further emphasized that academic librarians play a more extensive role in online courses than solely providing traditional services.

Moreover, current knowledge of LIS as well as communication and instructional competencies are becoming more vital in this new ecology of education. In Canadian academic libraries, teaching and instructional activities are implemented as core library tasks – approximately 94% of the librarians in Ducas et al.’s (2020) study confirmed that teaching was part of their workload. Teaching roles not only boost librarians’ confidence, but also allow them to achieve higher job satisfaction, while enhancing the status of librarians and professionals in the field in general (Ducas et al., 2020). This resonates with Ma’s (2019) viewpoint, which underscores the necessity for the inclusion of teaching and learning as essential CPD topics for academic librarians. In light of these imperatives, librarians are required to be well versed in pedagogy to establish or innovate teaching and learning methods. Furthermore, an extension of their information technology competencies is vital to enable interactive presentations and tutorials, coupled with a proactive engagement with relevant literature in the field for a comprehensive grasp of the subject (Mohhtar and Mohamad, 2023).

**CPD delivery methods**

The study also uncovered a notable demand for CPD delivery methods that emphasize online learning, online training and online seminars. Interestingly, the traditional face-to-face method of delivery was found to be less appealing to the participants, being preferred by only 29.63% of the respondents. This preference for online formats reflects the proactive approach of academic librarians to stay abreast of current academic and professional developments that are closely aligned with the contemporary social context and technological advancements. These findings resonate with the research by Sacchanand (2014, 2021) highlighting the increasing activity of online learning in LIS CPD in Thailand and member countries of the Association of Southeast Asian Nations, as well as the rapid growth of online learning programmes and courses in Thailand.

Furthermore, these insights are consistent with the research conducted by Arua (2019), Gunasekera (2021), Hornung (2015), IFLA (2020), Ma (2019), Mooko and Oladokun (2021), Namaganda (2019) and Shahzad et al. (2023), which emphasizes the transformative impact of the COVID-19 pandemic and social
distancing on academic libraries and institutions. These challenges have necessitated an adaptation to online technologies – including online learning, virtual conferences and webinars – to ensure the continuous provision of services, further underscoring the significance of online delivery methods in the context of CPD.

Significantly, this study brought to light a compelling pattern: academic librarians primarily affiliated with institutions in Bangkok demonstrate a higher propensity for participating in CPD programmes compared to their peers in small and large cities. In contrast, academic librarians linked to institutions in small cities often refrain from engaging in CPD programmes altogether. These findings emphasize the necessity for a more deliberate distribution of CPD opportunities, considering factors such as location and accessible formats, to ensure that all academic librarians can readily take part in these programmes. Therefore, it is imperative to fully embrace online learning not merely as an alternative but also as a multifaceted delivery method to bridge gaps, enhance equal access to CPD opportunities, and extend the reach of education in evolving learning environments.

**Roles of CPD providers in developing the skills of academic librarians in Thailand**

The outcomes of this study also revealed that associated academic libraries and affiliated universities are the main CPD providers. In the Thai context, past studies have revealed that most academic librarians at Rajabhat universities in Thailand are required to participate in CPD programmes offered by in-house providers (e.g. Kaewkongsup et al., 2016). This is due to the fact that in-house providers can serve the specific needs of an individual academic library, with its unique mandates and goals based on the university’s mission, vision and objectives. This aligns with the findings of Gunasekera’s (2021) study, which states that university libraries in Sri Lanka have employed several strategies to encourage and support staff development. Significantly, IFLA also confirms that academic libraries and affiliated universities are important CPD providers for their librarians. They not only offer training programmes and activities that are aligned with a library’s and university’s mission, vision and goals, but also showcase the organization’s commitment and leadership through budget and time allocations for professional learning (Hallam and Varlejs, 2021). In addition, due to the COVID-19 crisis, it became evident that CPD for academic librarians, offered by in-house providers, was crucial to ensure that the goals, vision and needs of each university and academic library were met. Even though all universities have the same mission, their identities and focus may differ.

This research also found that academic librarians need to participate in CPD activities organized by academic library networks, with a particular emphasis on the annual conference of PULINET. This conference serves as the sole platform directly responsible for allowing academic librarians in Thailand to present their research. This is because PULINET was established with CPD at its core. Its organized CPD activities are open to all librarians as well as LIS educators and interested parties. On the other hand, Academic Resources and Information Technology Network (ARIT Network) is more focused on its network’s members. This study found that academic librarians can use this network as a tool for their career development and promotion. This practice mirrors the approach employed at Yale University, where academic librarians have the opportunity to seek promotion by submitting scholarly papers and other contributions, including active involvement in committees, conferences and programmes – all of which are taken into account as potential criteria for promotion (Yale Library, 2021). A comparable policy has been implemented at Virginia Commonwealth University (2022) as a pilot initiative.

**Library associations**

The findings of this study revealed that the Thai Library Association played a less significant role compared to PULINET as a CPD provider. Nearly half of the academic librarians in this study (121, 49.79%) participated one to three times a year in CPD programmes offered by the Thai Library Association, with only 8 (4.94%) participants attending such programmes more than three times a year. Surprisingly, only a quarter of the librarians were members of the Thai Library Association (62, 25.51%), despite the fact that the roles of the Association in providing CPD are constantly and widely promoted to its members and the LIS community at large. Various national library associations – for example, the American Library Association, Chartered Institute of Library and Information Professionals, and Australian Library and Information Association – also play active CPD roles for their members and the entire LIS community. A commitment to CPD as a core value for professional development within the code of professional practice is therefore needed (Ma, 2019). As such, Lamptey and Corletey (2011) recommend that national library associations play a greater role in
evaluating the needs for CPD among their members and LIS professionals; coordinating programmes that meet librarians’ needs; assessing the availability of effective communication channels; examining the appropriateness of the training delivered; and ensuring an increase in the number and variety of refresher courses for members to scale up their skills. Institutions and professional bodies, as well as library and information associations, should thus collaborate to encourage and promote CPD activities (Moonasar and Underwood, 2018).

Nonetheless, the Thai Library Association has demonstrated a commitment to the formulation of CPD policies and the establishment of standardized professional benchmarks for academic librarians in Thailand. The Association’s ongoing initiatives are closely aligned with the design and implementation of strategic plans aimed at fostering the development of LIS professionals, thereby equipping them with the requisite skills and competencies to function efficiently. Furthermore, these endeavours are instrumental in improving career opportunities at the national level—a fact substantiated and elucidated during the 2023 annual academic conference, organized by the Academic Library Group (Dissamana, 2023).

LIS schools
It is important to note that most LIS schools in Thailand focus on offering LIS programmes at the undergraduate and graduate levels. The mandate for LIS schools affiliated with Rajabhat universities around the country is ‘local development’. Therefore, the LIS schools in Rajabhat universities are to focus on programmes or activities that benefit school and public libraries. This is due to the fact that these libraries often experience difficulties since they are underfunded and lack appropriate learning materials and resources. Conversely, academic libraries have a higher status, with larger budgets, manpower and resources. In particular, the autonomous universities receive comprehensive support from their respective faculties, which enhances their flexibility in both the management and the provision of services (Swasdee and Suwanarat, 2015).

This study also revealed that academic librarians are more likely to be interested in CPD programmes that are hosted by LIS schools with a focus on short courses and training sessions, which are not essentially part of a ‘formal programme’ offered by LIS schools in higher education. Notably, IFLA (2016) recognizes that LIS educators play an important role in promoting the required ongoing learning among academic librarians. In an interview, Songphan Choemprayong, an Associate Professor at Chulalongkorn University, suggested that library schools should cooperate closely with academic libraries and librarians. This is due to the expertise that academic librarians and scholars can offer, which may benefit both career progression and research advancements within the field of LIS (Buangam, 2015).

National libraries
The findings of this research showed that academic librarians do not perceive the Thai National Library as a CPD provider. The Thai National Library does play a small role in CPD compared to other more prominent CPD providers. This is the result of the Library’s mandate, which is primarily to offer CPD support to its own staff and to provide services for the lifelong learning of people across the entire country. Meanwhile, the national libraries in other countries have different mandates. For instance, the National Library of India plays an essential role in supporting information professionals via webinars, and the objective of the Trinidad and Tobago national libraries is to encourage their staff to collaborate in various activities (IFLA, 2020). In Ireland, the Academic and National Library Training Co-operative was established through cooperation between the Irish National Library and academic libraries. Its objective is to identify training needs within member Irish academic and national libraries and to provide cost-effective training opportunities to library staff. This enables Irish academic and National Library professionals to enhance their competence, share experiences and build networks. Even though the Co-operative has continued to provide various programmes, training and consortia economically, it is still facing difficulties with regard to running costs, particularly at a location outside the capital city (Cannon, 2017). Meanwhile, the National Library of Maldives has encountered multiple challenges. These include a lack of expertise in curriculum development among the team; the necessity to benchmark its programmes against LIS courses offered regionally and internationally; and the need to align with the specifications of the Maldives Qualification Framework (Oladokun and Mooko, 2023).

Recommendations
The outcomes of this research lead to a number of recommendations that could benefit academic librarians and academic libraries, as well as CPD providers, and help them orient their programmes post-pandemic and prepare for the future:
1. Academic librarians should prioritize the enhancement of their information technology skills by leveraging existing and emerging technologies, in addition to making the most of online learning opportunities and social media platforms.

2. CPD programmes for academic librarians should be prioritized by connecting libraries and universities, whether through self-organization, workplace learning or learning organization environments, and by facilitating librarians’ transition into new contexts and environments. The roles of academic librarians as teachers and instructional partners should be highlighted, despite their non-academic standing.

3. The academic library network PULINET is an important element and plays a critical role in LIS development. The network should thus broaden its scope to become a national university library network and provide the opportunity for Academic Resources and Information Technology Network (ARIT Network) to become a member or associate member so that both organizations can benefit from such collaboration and enhance the country’s overall development. Furthermore, CPD-related topics of interest to academic librarians based on their needs, current issues and trends in academic librarianship should be prioritized.

4. Professional associations and LIS schools should take advantage and make full use of digital technology and online learning to play more proactive roles in developing new CPD approaches, especially through online programmes. They should organize CPD activities in various formats on topics pertinent to current issues and trends for various groups of LIS professionals. In addition, the Thai Library Association should work together with all CPD providers in Thailand and abroad, and act as a network for CPD to develop librarians and LIS professionals and staff.

Conclusion

In summary, this research sheds light on the state of CPD for academic librarians in Thailand and the pivotal roles of CPD providers. The study’s recommendations underscore the importance of academic librarians honing their information technology skills and embracing technology for professional growth. It also advocates for a stronger focus on CPD programmes that foster closer ties between libraries and universities while recognizing academic librarians’ instructional roles. Furthermore, it highlights the need for academic library networks to expand and collaborate at both the national and international levels. Lastly, it encourages professional associations and LIS schools to leverage digital technology for innovative CPD approaches aligned with current trends. In essence, this research provides thoughtful guidelines for adapting and thriving in the evolving post-pandemic educational landscape, with the aim of ensuring that academic libraries in Thailand can remain responsive to the changing needs of the academic community. Moreover, it serves as a valuable model for other countries facing similar challenges, offering insights and strategies that can be adapted to their specific contexts.

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Effect of humble leadership on knowledge sharing, change and ethnicity in Iranian public libraries

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Abstract
This research explores the influence of humble leadership on knowledge sharing and adaptability in Iranian public libraries, with a focus on ethnic diversity. Using a quantitative approach and correlational studies, the study examined public library staff from various ethnic backgrounds in Iran, employing random cluster sampling. The results indicate that humble leadership positively affected both the willingness to adapt and knowledge sharing among library staff. Moreover, an analysis using the Kruskal–Wallis test revealed that one aspect of humble leadership – ‘Acknowledgement of personal limitations’ – had only a weak connection to ethnicity. Interestingly, Iranian Arab ethnicities expressed less preference for humble leadership yet knowledge sharing and adaptability improved among employees from all ethnic backgrounds. This research breaks new ground by simultaneously investigating various variables, including ethnicity, in relation to humble leadership. The findings have significant implications for public library management, highlighting the importance of effective communication and empathy in reducing employee resistance to knowledge sharing and organizational change.

Keywords
Humble leadership, knowledge sharing, change readiness, ethnicity, public libraries, library management

Introduction
In the landscape of organizational dynamics, leadership plays an unparalleled role. Studies have consistently shown that ineffective leadership constitutes a significant portion of organizational failures when implementing crucial changes and improvements (Chamani Fard and Nikpour, 2018). For an organization to flourish, leaders must adeptly navigate its present circumstances and future trajectory, guiding individuals towards their objectives while fostering a climate that thrives on change and transformation (Mazloumi et al., 2012).

The evolution of leadership into a specialized domain centred on change has ushered in a new skill set for modern leaders (Shelton and Darling, 2001). Within this domain, one attribute stands out: humble leadership. Weick’s (2001) argument underscores the contemporary leader’s need for a blend of high humility and low pride when confronting unexpected challenges and changes. This sentiment resonates through various perspectives, with effective leaders recognized for their significant levels of humility in navigating change (Nazari et al., 2019).

Sara Blakely, a voice in leadership, emphasizes humility as a cornerstone trait. Humble leadership entails acknowledging multiple viewpoints, nurturing self-awareness and leading from a place of generosity rather than ego. This approach encompasses emotional intelligence, fostering an appreciation of colleagues and cultivating an environment of autonomy, accountability and collaboration.

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Considering these insights, the importance of humble leadership becomes evident in inspiring and motivating employees towards organizational triumph. Research corroborates humble leadership as pivotal for workplace well-being, nurturing psychological safety and efficient error management (Zhong et al., 2020). It serves as a countermeasure to staff resistance towards sharing knowledge and embracing change, offering a potent solution to enhance both practices (Al Hawamdeh, 2022).

Concurrently, libraries function as nuclei for knowledge dissemination, entrusted with meeting user needs in an ever-competitive sphere. Knowledge management has transformed into a linchpin for 21st-century libraries, with human resource management playing a pivotal role (Shanhong, 2000). In this context, librarians must engage in knowledge exchange to tackle the myriad challenges they face, necessitating an enduring commitment to continuous learning (Liu et al., 2010; Shanhong, 2000).

People stand at the nucleus of organizational transformation, with their willingness to embrace change emerging as pivotal (Malaki et al., 2011). Amid these trials, the researcher’s experiences within public libraries highlight a discernible connection between leadership style and challenges related to knowledge sharing and change management. Consequently, libraries must tailor their strategies and assess employees’ preparedness for change.

Iran, an expansive and diverse nation with around 85 million inhabitants, showcases an intricate social tapestry. While a significant proportion of the population identifies as Persian, the country accommodates 12 distinct ethnicities. Among the notable groups are the Azeris (Turks), Kurds, Arabs, Balochs, Turkmen and Lors, which all wield substantial influence in Iran’s political arena. Iran’s cultural mosaic unfolds through its myriad ethnic groups, with each contributing its unique culture, aspirations and needs. The interplay of ethnicity assumes particular significance within the domains of social sciences and humanities research. Remarkably, however, many studies within disciplines such as library and information science, management and leadership have largely overlooked the impact of ethnic diversity on pivotal factors.

Notably, a multitude of works, including The Oxford Handbook of Iranian History (Daryaeae, 2012), offer comprehensive insights into Iran’s diverse ethnic groups and their historical context. Similarly, the works by Entessar (1997) and Samadi and Rezaei (1998) delve into the role of ethnicity in social sciences and humanities in Iran. Acknowledging the profound significance of effective knowledge sharing and the imperative of adapting to change within libraries, this research embarks on uncharted terrain, particularly underscoring the necessity of investigating the impact of ethnicity. To achieve this, the research framework adopts the perspective of humble leadership.

By delving into the intricate connection between humble leadership, knowledge sharing and the inclination towards change, the research seeks to shed light on this uncharted realm. Given the significance of knowledge sharing, change and the influence of ethnicity, this research focuses on the role of humble leadership. It explores how this leadership style impacts knowledge sharing and the willingness to adapt among library staff from diverse ethnic backgrounds in Iran.

This research aims to investigate the impact of humble leadership on knowledge sharing and the willingness to adapt among public library staff, considering the dimension of ethnic diversity. The study addresses three hypotheses: (1) there is a significant correlation between humble leadership and knowledge sharing in libraries; (2) humble leadership significantly relates to staff’s willingness to embrace change; and (3) ethnicity is a significant factor influencing willingness to change, knowledge sharing and humble leadership.

**Literature review**

Wang et al.’s (2018) research reveals three key findings: (1) psychological safety mediates the relationship between humble leadership and follower creativity; (2) knowledge sharing moderates the relationship between psychological safety and follower creativity; and (3) humble leadership’s indirect effect on follower creativity through psychological safety is more pronounced when knowledge sharing is high. Wang et al.’s study presents specific findings that emphasize the interplay of humble leadership, psychological safety and knowledge sharing in fostering follower creativity. This aligns with this text’s broader objective of investigating the impact of humble leadership on knowledge sharing and willingness to change among public library staff in Iran, taking into account ethnic diversity. Both texts underline the crucial role of leadership, psychological safety and knowledge sharing in facilitating positive organizational outcomes. While Wang et al.’s study provides empirical evidence for these relationships, this text lays the groundwork for examining these dynamics in a unique context – Iranian public libraries – and exploring the influence of ethnicity on these factors. The synthesis highlights a shared
emphasis on leadership’s influence on employee behaviour and organizational success, with this text extending the discussion to include the impact of ethnicity on these dynamics.

Research conducted by Arayesh and Khajavi (2019), entitled ‘The role of efficient managers in managing change and improving the organization’, yielded the following result: to constructively and effectively guide changes within an organization, planning, design and management should take into consideration modifications and advancements across all aspects of the organization. Thus, it can be acknowledged that managers play a pivotal role in empowering and transforming employees within the organization. The findings of this research demonstrate the crucial role of managers in fostering organizational flexibility. Moreover, while managers are examined in this study, leadership is also taken into consideration, since leadership within organizations entails a more human aspect and is contingent on guiding employees in achieving objectives. Arayesh and Khajavi’s findings underscore the significance of effective management in guiding changes and advancements across all aspects of an organization. This is consistent with this text’s focus on the impact of humble leadership on knowledge sharing and willingness to change among public library staff in Iran. However, this text focuses on leadership rather than management, and ethnicity and knowledge sharing are the main variables in this study. There are texts that are not included in Arayesh and Khajavi’s study.

In research undertaken by Roudi et al. (2019), entitled ‘Examining the components of leadership and organizational culture on the tacit knowledge sharing of library staff of Iranian public universities’, it was found that there was a positive and significant correlation between organizational leadership and dimensions of organizational culture and tacit knowledge sharing. Moreover, the components of organizational leadership and organizational culture had a profound impact on sharing tacit knowledge, enabling employees to gain empowerment, fostering innovation and creativity, boosting productivity, offering a competitive advantage and promoting a sense of belonging in an organization. The objective of this research is in line with one of our research inquiries, and it focuses on the library, as we do here. However, variables such as the willingness to change and ethnicity were not examined in Roudi et al.’s study. The current research therefore encompasses a broader scope.

In Nikpour’s (2019) research, entitled ‘The effect of managers’ lean leadership skills on readiness for change in the public sector: Analyzing the mediating role of organizational trust’, it was found that managers’ lean leadership skills had not only a direct influence on readiness for change but also an indirect influence through organizational trust. Furthermore, employees’ organizational trust was revealed to mediate the relationship between managers’ application of effective leadership skills and readiness for change. Although Nikpour’s research aligns with previous studies that focus on management variables, it does not include an examination of leadership. Both Nikpour’s study and our text underscore the significance of leadership skills in driving organizational change and influencing employee attitudes and behaviours. While Nikpour’s text focuses on lean leadership skills and their impact on readiness for change, with organizational trust as a mediating factor, this text explores the concept of humble leadership and its effect on knowledge sharing and willingness to change in public libraries.

In a study conducted by Anand et al. (2019), titled ‘Does humility facilitate knowledge sharing? Investigating the role of humble knowledge inquiry and response’, the authors investigate the role of humility in knowledge sharing and identify several individual tendencies which predict that being humble about sharing knowledge can be beneficial. This research further emphasizes the effect of humble behaviour on knowledge sharing, which is one of the fundamental assumptions of our research. While both texts touch on the role of humility, they differ in scope and methodology. Anand et al.’s text primarily examines the role of humility itself in facilitating knowledge sharing, while our study expands the inquiry to the effects of humble leadership on knowledge sharing and change readiness. This text adopts a quantitative research approach – specifically, a correlational study design – whereas Anand et al.’s text’s methodology is not explicitly mentioned. Also, this text’s comprehensive approach, involving diverse ethnic backgrounds in Iran, further enriches understanding of how leadership styles intersect with factors like ethnicity to shape employee behaviours and attitudes towards knowledge sharing and change.

Manteghi and Aghighi (2019) propose that humble leadership is a new form of independent leadership that has yet to be fully explored. Through their research, they confirm the mediating role of psychological capital in motivating employee innovation behaviour when led by a humble leader. Their study highlights how followers may perceive or react differently to the effects of their leader’s humble behaviours. Additionally, their research does not address the challenges associated with sharing knowledge or even a desire for change, but instead focuses on employees’ innovations under a leader who is
exhibiting humble behaviours. Combining the insights from both texts, it is evident that humble leadership is a multifaceted concept with various implications for employee behaviour. While Mantegehi and Aghighi showcase how humble leadership can impact employee innovation behaviour through the mediating role of psychological capital, this text expands the discussion to encompass the effects of humble leadership on knowledge sharing and willingness to change. Both texts highlight the significance of leadership behaviour in influencing employee attitudes and actions, with this text providing a more comprehensive perspective by examining these effects within the context of public libraries and the dimension of ethnic diversity. The synthesis underscores the need to consider various organizational outcomes when exploring the influence of humble leadership, beyond just innovation. In comparison to our research, humility stands out as one of the most important characteristics among leaders that this study takes into account.

In general, many prior studies have examined the relationship between humble leadership and the variable of either knowledge sharing or desire for change. The advantage of this research lies in addressing the two major challenges that libraries face. To further elaborate on this difference, we discuss some of the previously published literature. Nguyen et al. (2020), for example, discovered in their research, titled ‘Leader humility and knowledge sharing intention: A serial mediation model’, that there is a positive correlation between humble leadership and knowledge sharing. Combining the insights from both texts, it is clear that humble leadership is associated with increased knowledge sharing among employees. Nguyen et al. provide a concise assertion of the positive correlation between humble leadership and attention to knowledge sharing. Our text expands on this concept by conducting a comprehensive research study to explore the broader effects of humble leadership, including its impact on knowledge sharing and willingness to change among public library workers of diverse ethnic backgrounds. The synthesis emphasizes the importance of humble leadership in fostering a climate that is conducive to knowledge sharing and organizational change, with our text providing a more detailed and contextualized perspective.

Zainol et al. (2021) explored the effect of effective management on knowledge management and found that managers should be able to motivate their personnel in order to facilitate organizational change. Combining the insights from both texts, it becomes apparent that leadership styles, whether they involve effective management or humble leadership, have a significant impact on employee behaviour, knowledge sharing and willingness to change. Zainol et al. provide a broader understanding of how effective management can motivate personnel and facilitate change, while our text narrows the focus to humble leadership and its ability to increase both knowledge sharing and willingness to change among public library workers with a focus on diverse ethnic backgrounds in Iran. The synthesis underscores the crucial role that leadership plays in shaping employee attitudes and behaviours related to knowledge and change.

Errida and Lotfi’s (2021) research is on the topic of the ‘determinants of organizational change management success’. They identify several factors that had an impact on the success of organizational change management initiatives, which are categorized into 12 different factors. Understanding these success factors can help managers to efficiently implement changes in their organizations. Errida and Lotfi emphasize the importance of identifying success factors in the context of organizational change management, whereas our text underscores the significance of humble leadership in promoting knowledge sharing and willingness to change among employees, and also examines the role of ethnicity in different dimensions.

Qu et al. (2022) demonstrate that humility yields positive outcomes, and a humble leadership style facilitates knowledge sharing by cultivating psychological safety in learning communities. Combining the insights from both texts highlights the role of humble leadership in fostering positive outcomes within organizations. Qu et al. contribute by showing that humility in leadership can cultivate psychological safety, contributing to knowledge sharing and favourable results. This text provides a detailed research context, methodology and findings specific to public library workers, indicating that humble leadership increases both knowledge sharing and willingness to change, and it also examines the role of ethnicity in different dimensions.

In recent years, few studies have examined the relationship between leadership style and ethnicity, and most have focused on how ethnicity and gender, for example, can affect the selection of a leader’s leadership style, as well as the challenges they might face due to their specific ethnicity – such as Morgan et al.’s (2021) study, which found that the chief executive officers of most cancer centres were white males. Chin (2013) further explored the need for greater diversity in leadership based on gender, ethnicity and minority status, noting that women and many ethnic minorities experience more difficulties in becoming leaders than others. In contrast, this article
takes a different approach to exploring leadership and ethnicity. Given that previous research has yet to consider the variables of both knowledge sharing and willingness to change simultaneously, as well as the variable of ethnicity, which has not been examined thus far, this study could help enhance leadership and its place in libraries.

**Materials and methods**

This research is a quantitatively driven, applied, descriptive, non-experimental study. The correlational study used in this research examines two viewpoints of the ethnicity variable – that is, (1) as a considered variable, where data was collected from numerous ethnic groups according to their population size, and a sample size was selected for each group proportionally, and (2) as an independent variable, which influences the other three variables examined in this research (knowledge sharing, willingness to change and humble leadership). The ethnicity variable in the first section of the research, which was dedicated to investigating the role of humble leadership in knowledge transfer and employees’ willingness to change in selected city libraries, was considered as an observational variable and had no intervention in the hypothesis testing. Solely due to the fact that libraries and librarians were selected from regions with different ethnicities (meaning that the questionnaire respondents belonged to the ethnicities mentioned in the article), ethnicity was regarded as an observational variable in this section of the research. In the subsequent section, it is introduced as a primary variable in the related hypothesis testing.

This research focused on public library employees in Iran, who come from a variety of ethnic backgrounds. In particular, six larger ethnic groups – Balochs, Kurds, Turks, Lors, Arabs and Turkmens – were selected for the study; other ethnicities were not included due to their smaller numbers. Nonetheless, Iran has many more religious and linguistic ethnicities than those examined here.

For the selection of the sample, not only was employment in an ethnic geographical area taken into account, but the ethnic background of the people was also of importance. A random cluster sampling method was employed in order to select library employees from the central cities within each province based on the population of their respective ethnicities. The research population totalled 645, and approximately 257 of these individuals were selected as samples using the Krejcie and Morgan table and distributed proportionally across different ethnicities in the country. Table 1 shows the approximate number of the population of Iranian ethnic groups based on community size and the number of samples.

<table>
<thead>
<tr>
<th>Ethnic group</th>
<th>Selected city and province</th>
<th>Community size (approximate)</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turks</td>
<td>Tabriz, East Azerbajan</td>
<td>215</td>
<td>82</td>
</tr>
<tr>
<td>Kurds</td>
<td>Sanandaj, Kurdistan</td>
<td>110</td>
<td>45</td>
</tr>
<tr>
<td>Lors</td>
<td>Khorramabad, Lorestan</td>
<td>115</td>
<td>45</td>
</tr>
<tr>
<td>Turkmens</td>
<td>Gonbad, Golestan</td>
<td>55</td>
<td>22</td>
</tr>
<tr>
<td>Arabs</td>
<td>Khorramshahr, Khuzestan</td>
<td>85</td>
<td>35</td>
</tr>
<tr>
<td>Baluchs</td>
<td>Zahedan, Sistan and Baluchistan</td>
<td>65</td>
<td>28</td>
</tr>
</tbody>
</table>

The total number of public libraries in Iran is approximately 3500, and it is evident that the number of employees in these libraries exceeds 645. However, in this study, only public libraries in provinces with Kurdish, Lor, Azeri or Turk, Turkmen, Baloch or Arab ethnicities have been considered, where the number of employees amounted to approximately 645 individuals.

In determining the sample sizes presented in Table 1, the approach was to allocate the number of samples based on the proportion of each ethnic group within the total population (645 individuals). For instance, considering the Turk community (Azeri), which constituted around 33% of the total population (645 individuals), a corresponding sample size of 33% was chosen for this ethnicity, resulting in a sample of 82 individuals. Similar calculations were applied to the other ethnicities.

It is noteworthy that Persians are not included in this research, despite being the largest ethnic group in Iran. This is because an increase in their population would distort the normal distribution of the data; moreover, they have been the subject of a separate study. Previous studies conducted on humble leadership, knowledge sharing and desire to change in Iran have also mainly encompassed the Persian ethnicity. Among these, the studies by Arayesh and Khajavi (2019), Roudi et al. (2019) and Nikpour (2019) are notable examples, as they were conducted in Persian-speaking ethnic regions. Therefore, not only would the large proportion of this population lead to sample skewness and non-normality of society with regard to the findings, but it has also been studied many times over.

Table 1. The approximate Number of the population of Iranian ethnic groups.
The random cluster sampling process employed in this research can be summarized as follows:

- **Dividing the population into clusters:** in this initial step, the entire population was divided into clusters based on geographic regions—specifically, provinces with distinct ethnicities.

- **Random selection of clusters:** initially, a subset of provinces was randomly chosen from the various provinces. Following this, the central city of each selected province was identified as a sample city.

- **Inclusion of all members:** subsequently, all libraries within the chosen cities were incorporated into the sample. The selection of the participants was completely random, providing an equal chance for each individual.

This sampling approach facilitated the representation of diverse geographical regions and allowed for the comprehensive inclusion of libraries and individuals, enhancing the validity and robustness of the study’s findings.

**Data-gathering tools**

This research employed a researcher-developed questionnaire, which was divided into three sections pertaining to the variables of humble leadership, willingness to change and knowledge sharing. The questionnaire included a total of 32 questions, which were formulated based on the items found within three established standard questionnaires. The rationale behind the creation and utilization of the researcher-generated questionnaire stemmed from the dispersion and substantial quantity of questions in the standard questionnaires. This complexity resulted in respondent fatigue and reluctance. Consequently, the research team devised a questionnaire that succinctly yet comprehensively encompassed the essence of the questions found in the three standard questionnaires. The standard questionnaires that were used were the following (the corresponding number of questions incorporated from each source is given):

- The **Humble Leadership Questionnaire**, which is based on the three components of the humble leadership theory outlined by Owens et al. (2013). Our questionnaire contains nine items measuring acknowledging individual limitations (Questions 1 to 3), appreciating the strengths of others (Questions 4 to 6), and teachability and learning from others (Questions 7 to 9). Responses are recorded in a Likert-scale format with five options (always, often, sometimes, rarely, never).

- The **Knowledge Sharing Questionnaire**, which consists of five items that measure the two components of knowledge-sharing theory (Bock et al., 2005). In our questionnaire, Questions 1 and 2 assess hidden knowledge, and Questions 3 to 5 evaluate open knowledge. Responses to this questionnaire are given via a Likert scale of choices (always, often, sometimes, rarely, never).

- The **Change Readiness Questionnaire**, which is based on Dunham et al.’s (1989) theory of readiness for change. Our questionnaire consists of five items that measure cognitive reaction (Questions 1 to 6), emotional reaction (Questions 7 to 12), and behavioural reaction (Questions 13 to 18). Answers are given using a Likert scale (always, often, sometimes, rarely, never).

The face validity of our questionnaire was endorsed by 10 professors specializing in library and information studies. The overall Cronbach’s alpha coefficient was .85, signifying a satisfactory level of reliability. The results of calculating the Cronbach’s alpha and content validity for the three sections of the questionnaire are presented in Table 2.

The data presented in Table 2 indicates that the questionnaire developed by the researchers for this study possessed the essential validity and reliability required for conducting the test. The data of this research is of the ordinal type, so non-parametric tests were used to conduct the research.

**Table 2: Reliability and validity of the questionnaire.**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach’s alpha</th>
<th>Content validity ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humble leadership</td>
<td>.84</td>
<td>0.79</td>
</tr>
<tr>
<td>Knowledge sharing</td>
<td>.88</td>
<td>0.75</td>
</tr>
<tr>
<td>Desire to change</td>
<td>.83</td>
<td>0.84</td>
</tr>
</tbody>
</table>

**Data analysis**

To answer the research hypotheses, SPSS (Statistical Package for the Social Sciences) inferential statistics such as Spearman’s correlation coefficient, multivariate regression and Kruskal–Wallis were utilized. Notably, ethnicity was initially just an observer variable (not directly included in the analyses). However, to balance out the data, an equal number of questionnaires was eventually analysed for each ethnicity to
examine willingness to change, knowledge sharing and the state of humble leadership. In total, 120 survey responses were used for this part of the study, with 20 from each ethnicity. Additionally, all of the surveys used a Likert scale for the hypothesis tests. Because the questionnaires were completed blind by the study participants, there was no distinction or superiority among them. As a result, 20 questionnaires were randomly selected from each ethnicity to test the hypotheses related to the ethnic diversity aspect of the study.

Results

First hypothesis

To evaluate the initial hypothesis of the research – ‘Humble leadership does not have a significant relationship with knowledge sharing in libraries’ – a multivariate regression was conducted, with the subcomponent of humble leadership as the independent variable and the knowledge-sharing subcomponent as the dependent variable. The results are presented in Table 3.

The adjusted coefficient of determination for Model 1, with knowledge sharing as the dependent variable, is 0.490. This implies that subcomponents of humble leadership are able to explain 49% of changes in knowledge sharing. The Durbin–Watson statistic value falls within the range of > 1 and < 3, indicating minimal autocorrelation among the model variables. This suggests that the model is capable of fitting adequately and is less prone to errors during the modelling process.

It should be noted that the two models (Model 1 and Model 2) mentioned in this article are the only statistical models that Afar SPSS software has used to calculate and order the entry of variables in hypothesis testing using the multivariate regression method, and therefore these models do not include external drawings and special non-statistical explanations in this article. A multivariate regression model is a statistical tool that is used to analyze relationships between one dependent variable and one or more independent variables (explanatory variables). In this type of analysis, the dependent variable, also known as the response variable, is defined, and independent variables serve as explanatory variables. A multivariate regression model can be employed to examine the impact of one or more independent variables on the dependent variable and predict the value of the dependent variable based on the values of the explanatory variables. The multivariate regression model is constructed using mathematical equations – typically linear or nonlinear equations – integrated into statistical analysis. In a multivariate regression model, the relationship between the response and explanatory variables is investigated through regression coefficients, which indicate how the response variable changes in response to changes in the explanatory variables.

Figure 1 illustrates the estimated values of Model 1 relative to the errors, which are within the confidence interval of 1.5–2.5, thus demonstrating that the regression errors are independent. Figure 1 demonstrates the robustness of the regression model by incorporating nearly all the significant variables and establishing accurate relationships among them. It is noteworthy that the absence of any noticeable pattern or trend in the residuals further substantiates the model’s reliability.

Furthermore, a regression analysis was conducted to examine the null hypothesis outlined in Table 4, wherein humble leadership subcomponents acted as independent variables and knowledge-sharing subcomponents were designated as dependent variables.

Table 4 demonstrates that the significance level of all three components of humble leadership in the model is < .05. As such, these components can potentially be an effective predictor for knowledge sharing. Nevertheless, to evaluate the connection between knowledge sharing and humble leadership further, a Spearman’s correlation coefficient was applied, the results of which are presented in Table 5.

The Spearman’s correlation coefficient between humble leadership and employee knowledge sharing is 0.702, which, with a significance level of .000, indicates a significant correlation between the two variables. Therefore, the null hypothesis is not supported. Furthermore, this test reveals that an increase in humble leadership leads to increased knowledge sharing among library staff.

The data in Table 6 reveals that, with a t-value of 10.153 and p < .05, the independent variable (humble leadership) is statistically significant. Additionally, with a positive standard beta coefficient (0.702) and p < .05, it is clear that humble leadership has a significant influence on employees’ knowledge sharing. An increase of one standard deviation in humble leadership will result in an increase of 0.702 of a standard
deviation in knowledge sharing. Therefore, it can be concluded that humble leadership improves employee knowledge sharing.

**Second hypothesis**

In order to test the second hypothesis – ‘Humble leadership does not have a significant relationship with the desire to change in library staff’ – a multivariate regression was conducted, with the subcomponents of humble leadership as the independent variable and desire to change as the dependent variable. The results are presented in Table 7.

The adjusted coefficient of determination for Model 2 in relation to the dependent variable of desire to change was 0.459, indicating that humble leadership subcomponents have been able to predict 44% of the variation in desire to change. Similarly to Table 3, the configuration of the model is elucidated here, shedding light on how the variables are integrated into the regression analysis. In this context, every variable has been included in the model, effectively

### Table 4. Regression results between the subcomponents of humble leadership and knowledge sharing.

<table>
<thead>
<tr>
<th>VIF</th>
<th>Sig.</th>
<th>t</th>
<th>Beta</th>
<th>SE</th>
<th>B</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.002</td>
<td>3.147</td>
<td>–</td>
<td>–</td>
<td>0.286</td>
<td>0.900</td>
<td>Width from origin (constant)</td>
</tr>
<tr>
<td>1.056</td>
<td>.000</td>
<td>6.135</td>
<td>0.453</td>
<td>0.051</td>
<td>0.315</td>
<td>Acknowledgement of personal limitations</td>
</tr>
<tr>
<td>1.149</td>
<td>.000</td>
<td>4.836</td>
<td>0.358</td>
<td>0.056</td>
<td>0.272</td>
<td>Appreciating the strengths of others</td>
</tr>
<tr>
<td>1.168</td>
<td>.006</td>
<td>20825</td>
<td>0.211</td>
<td>0.064</td>
<td>0.182</td>
<td>Teaching and learning from others</td>
</tr>
</tbody>
</table>

VIF: variance inflation factor.

### Table 5. Results of correlation coefficient test of the relationship between humble leadership and knowledge sharing.

<table>
<thead>
<tr>
<th>Direction of relationship</th>
<th>Sig.</th>
<th>Correlation value</th>
<th>Dependent variable</th>
<th>Independent variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive and direct</td>
<td>.000</td>
<td>0.702</td>
<td>Knowledge sharing</td>
<td>Humble leadership</td>
</tr>
</tbody>
</table>

### Table 6. Regression results between humble leadership and knowledge sharing.

<table>
<thead>
<tr>
<th>Sig.</th>
<th>t</th>
<th>Beta</th>
<th>SE</th>
<th>B</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>.004</td>
<td>2.905</td>
<td>–</td>
<td>0.278</td>
<td>0.807</td>
<td>Width from origin (constant)</td>
</tr>
<tr>
<td>.000</td>
<td>10.153</td>
<td>0.702</td>
<td>0.077</td>
<td>0.779</td>
<td>Humble leadership</td>
</tr>
</tbody>
</table>

Figure 1. Predicted values against error values related to Model 1.
constituting the model. To facilitate distinction, Model 2 has been employed instead of Model 1, underscoring the intention to differentiate between the alterations in Table 6. Furthermore, just as in the prior instance, the Durbin–Watson statistic – falling between 1 and 3 – signifies minimal autocorrelation among the model variables. This suggests that the model is capable of fitting adequately and is less prone to errors during the modelling process.

In the ‘Model’ column, it should be noted that for this test, all variables, including both the independent and dependent variables, were incorporated into a single model. As a result, the provided command has generated a singular model where the software assessed the interconnectedness of the variables within the model. In light of the ordinal nature of the data, ordinal regression was employed for the analysis.

Figure 2 depicts the predicted values in comparison to the error values of Model 2. The Durbin–Watson statistic, which tests for the independence of errors, is at 1.793 and 1.853, respectively, for Model 1 and Model 2, showing that the errors are independent and within a safe and reliable range (1.5–2.5). Figure 2 demonstrates the robustness of the regression model by incorporating nearly all of the significant variables and establishing accurate relationships among them. It is noteworthy that the absence of any noticeable pattern or trend in the residuals further substantiates the model’s reliability.

Table 8 presents the results of the regression between the subcomponents of humble leadership and desire to change.

The results presented in Table 8 corroborate previous research regarding knowledge sharing, implying that the components of humble leadership play a role in employees’ desire to change within the libraries studied.

The Spearman’s correlation coefficient for examining the association between humble leadership and changes desired by library staff is displayed in Table 9.

The Spearman’s correlation coefficient between the two variables of humble leadership and employee desire to change is 0.668, demonstrating a statistically significant correlation, given the significance level of .000. Therefore, the null hypothesis has not been supported as true. Additionally, this test indicates that an increase in humble leadership yields an increased desire for change among library staff.

It can be confidently asserted that there is a positive and significant correlation between humble leadership and the desire for change among library staff, as indicated by the data in Table 10. Moreover, with an increase of one standard deviation in humble leadership, employees’ desire to change will also increase by 0.668 of a standard deviation.

Table 7. Multivariate regression indices of subcomponents of humble leadership and desire to change.

<table>
<thead>
<tr>
<th>Durbin–Watson value</th>
<th>Adjusted coefficient of determination</th>
<th>Coefficient of determination</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.885</td>
<td>0.444</td>
<td>0.459</td>
<td>2</td>
</tr>
</tbody>
</table>

Third hypothesis

The third hypothesis of this research comprises three null hypotheses: (1) ‘Ethnicity does not have a significant relationship with the desire to change’; (2) ‘Ethnicity does not have a significant relationship...
with knowledge sharing’; and (3) ‘Ethnicity does not have a significant relationship with humble leadership’. To test these hypotheses, Spearman’s correlation coefficient was utilized to assess the significance and direction of the relationship between the independent variable (i.e. ethnicity) and each of the dependent variables, including desire to change, knowledge sharing and humble leadership. Table 11 shows the results of the Spearman’s correlation coefficient between the variables.

At a significance level of .05, Spearman’s correlation coefficient showed that the variables of knowledge sharing and willingness to change among library staff are not correlated with their ethnicity, since $p > .05$. However, there was a weak correlation between humble leadership and ethnicity, as the obtained coefficient is very close to but slightly smaller than .05. Therefore, all three null hypotheses cannot be supported.

To further evaluate the relative association observed in humble leadership (Table 11), a Kruskal–Wallis test was performed on each ethnic group in terms of the subcomponents of humble leadership (Table 12).

The Kruskal–Wallis test results presented in Table 12 show that there was a relationship between ‘Acknowledgement of personal limitations’ and ethnicity. This indicates that the average answers given by different ethnicities were different only for this option, as shown in Table 13, which displays the averages of each of the three subcomponents of humble leadership.

The data in Table 13 demonstrates that the average score for the subcomponent ‘Acknowledgement of personal limitations’ within the Arab ethnic group in Iran is close to the average, whilst the remainder of the subcomponents are above average. This implies that ethnicity has a huge influence on humble leadership. The findings from Table 11 support this conclusion.

**Discussion**

Humble leadership is grounded in the principle that if someone wishes to lead others, others must first learn to follow them (Anand et al., 2019). The research findings suggest that the humble leadership style – which is rooted in mutual respect between a leader...
and their employees – has a significant and meaningful correlation with knowledge sharing amongst public library personnel in Iran. This implies that successful learning organizations require leaders who are respected by their subordinates and act as facilitators of both knowledge transfer and sharing. The findings of this study provide valuable insights into the complex relationships between humble leadership, knowledge sharing, willingness to change and the influence of ethnicity among public library staff in Iran. These insights both extend and are intricately aligned with the scholarly discussions presented in the literature review. Throughout this discussion, we will explain how the results of this research intricately interweave with and build on the studies cited in the literature review, and emphasize the central role of humble leadership in shaping organizational dynamics. It is especially emphasized in library environments and among different ethnic backgrounds.

Swain (2018) reiterates that a leader’s humility can foster the smooth flow of information within an organization or team. This further demonstrates how humble leadership can have a positive influence on the exchange and sharing of knowledge throughout an organization or team. Moreover, Wang et al. (2018), Anand et al. (2019) and Nguyen et al. (2020) have all verified through their research that humble behaviour from leaders encourages employees to share knowledge within an organization while simultaneously reducing resistance.

Libraries in Iran are faced with a number of challenges, which necessitate change in order for them to survive. By focusing on library leadership, these changes can be successfully implemented, as research has demonstrated a positive and meaningful relationship between humble leadership and an employee’s willingness to make such changes. According to Arazyesh and Khajavi (2019), Nikpour (2019), and Vera and Rodriguez-Lopez (2004), the characteristic of humility as a leader can have a significant impact on organizational performance by increasing organizational learning and flexibility. Therefore, the humbler the library leaders are in their style of leading, the less resistant employees will be to making necessary modifications.

The primary focus of the current research was to assess the effect of ethnicity on three variables – humble leadership, knowledge sharing and desire for change – among Iranian public library employees. While prior studies, such as Morgan et al. (2021) and Chin (2013), have explored the impact of ethnicity on leadership selection and challenges, this research uniquely examines how ethnicity intersects with leadership styles and behavioural factors within libraries.

The results of the data analysis reveal that there is no

<table>
<thead>
<tr>
<th>Variable</th>
<th>Kruskal–Wallis H</th>
<th>df</th>
<th>Chi-square</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educability of learning from others</td>
<td>0.137</td>
<td>5</td>
<td>.984</td>
<td></td>
</tr>
<tr>
<td>Acknowledgement of personal limitations</td>
<td>6.777</td>
<td>5</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Appreciating the strengths of others</td>
<td>0.127</td>
<td>5</td>
<td>.973</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nationality</th>
<th>Acknowledgement of personal limitations</th>
<th>Educability of learning from others</th>
<th>Appreciating the strengths of others</th>
</tr>
</thead>
<tbody>
<tr>
<td>N Valid</td>
<td>119</td>
<td>119</td>
<td>119</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>M</td>
<td>3.93</td>
<td>4.07</td>
<td>4.15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Acknowledgement of personal limitations</th>
<th>Educability of learning from others</th>
<th>Appreciating the strengths of others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arab</td>
<td>3.38</td>
<td>4.05</td>
<td>4.19</td>
</tr>
<tr>
<td>Kurd</td>
<td>4.10</td>
<td>4.05</td>
<td>4.15</td>
</tr>
<tr>
<td>Lor</td>
<td>4.00</td>
<td>4.05</td>
<td>4.20</td>
</tr>
<tr>
<td>Turk</td>
<td>4.11</td>
<td>4.11</td>
<td>4.11</td>
</tr>
<tr>
<td>Turkmen</td>
<td>3.95</td>
<td>4.05</td>
<td>4.15</td>
</tr>
<tr>
<td>Baloch</td>
<td>4.11</td>
<td>4.07</td>
<td>4.16</td>
</tr>
</tbody>
</table>
leadership style can have a direct and positive effect on knowledge sharing and the desire to change in libraries. This research further examined these two variables while taking into account the impact of ethnicity, making it unique among existing studies. It was found that ethnic background did not significantly influence humble leadership, knowledge sharing and the desire to change within public libraries in Iran. However, it was observed that Iranian Arabs were less likely than other ethnic groups to accept humble leadership styles, especially when considering one particular subcomponent. This research has also examined how four main challenges of libraries interrelate, which has not been done in prior studies. It is recommended that future studies consider and explore the leadership styles of different ethnicities and the role of ethnicity when designing and providing library services.

Humble leadership stands as a pivotal leadership style in the modern world. By fostering employee motivation and commitment, this approach taps into their potential and contributes significantly to the overall success of organizations. Public libraries, which are particularly traditional bastions of knowledge sharing, have encountered transformative shifts in their services, demanding both knowledge-sharing capabilities and adaptability — the two key management challenges confronting libraries today.

The aim of this article can be divided into two parts. The first is the component assessing the impact of humble leadership on knowledge sharing and willingness to change, which can be extended to other communities and countries depending on the scale of the sample examined and the normality of the statistical population in the research. The second is the section analysing the influence of different ethnicities on humble leadership, knowledge sharing and readiness to change, which could prove especially useful in countries with diverse ethnicities — particularly those whose primary ethnicity is one of those investigated in this article — hence making it possible for these findings to be applicable. As a result, this article can be perceived as an international scientific study.

In conclusion, this study serves as a bridge between existing research and unexplored terrain, investigating the impact of humble leadership on knowledge sharing and willingness to change within the specific context of Iranian public libraries with diverse ethnic backgrounds. By connecting and expanding on the insights from prior studies, this research enhances the understanding of leadership’s multifaceted role in shaping organizational dynamics and paves the way for further exploration of leadership styles in diverse settings. By introducing the dimension of ethnic diversity and investigating the
intersection of humble leadership with knowledge sharing and willingness to change, this study provides a nuanced perspective on the complex interplay of these factors within the context of Iranian public libraries. These insights not only contribute to the existing body of knowledge, but also pave the way for future research to explore similar dynamics in other cultural contexts. As libraries continue to navigate the challenges of the modern world, these insights can inform strategies that promote effective leadership, knowledge sharing, and successful change implementation across diverse organizational and ethnic contexts.

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Note
1. The data was taken from the database of the Iranian traffic police and, due to the anonymity of the individuals, ethical issues have been observed. All of the procedures performed involving human participants were in accordance with the ethical standards of the institutional and national research committee, and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all of the individual participants included in the study.

References


Author biographies

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Musical score representation and retrieval in digital environments

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Abstract
This article aims to analyse the representation and retrieval of musical scores submitted by netizens or institutions, repositories and digital libraries across various digital environments such as score storage sites. It considers the characteristics of these interfaces and observes how the scores are thematically represented. The method employed in this study was exploratory research to search and retrieve scores, and descriptive research to analyse the thematic representation within these environments. The results reveal that these sites are organized by category, which helps netizens in their search for musical scores. The analysed sites differ in comprehensiveness and organization but have similar features with regard to indexing. Consequently, the study argues for investment in their structure, organization, languages and systems, and professional training.

Keywords
Musical score, indexing, representation, retrieval, metadata

Introduction
With the advent of the Internet and development of information and communications technologies, netizens now have new ways of interacting and communicating on the Web. Consequently, information science has had to keep up with technological advances and developments in order to adapt to the new practices of information treatment, organization, representation and retrieval in digital environments.

Digital environments, as complex environments, require technological resources that are compatible with the level of development of the information field (Souza et al., 2016). They are built and enabled by information and communications technologies, using online document storage sites created by netizens or institutions, repositories and digital libraries. Among these environments, digital libraries aim to organize digital information within their environment, which is linked to information search and retrieval, classification and categorization, libraries, and the automation of publications and databases (Borgman, 1999). Digital repositories have been developed as ‘information environments, which enable the processes of access to information, preservation and interoperability across information resources’ (Gonzalez et al., 2018: 5237). In turn, they are similar to traditional information environments, but with characteristics specifically geared to the digital environment, minimizing netizens’ information needs (Camargo and Vidotti, 2011: 43). Repositories are digital environments that are typically developed to store documents, such as musical scores, while institutional repositories have links to institutions such as companies, non-governmental organizations and universities, among
others. Both types of site aim to make their documents readily accessible on the Internet.

Due to the large amount of information on the Internet, Dougan (2006) points out that queries on search bars can produce an equally large number of results, even with consolidated tools. In addition, netizens often find it difficult to discern between different types of searches, such as a library catalogue, a Google search, the free web or the deep web itself, because if the information has been located via the browser on the Internet, they automatically assume that it is only available on the Web, without further understanding. Discerning the differences between the various types of storage sites can equip netizens to better navigate the options, effectively search and evaluate the available content, and form realistic expectations when searching for the desired document, such as a score in digital format, for example (Dubnjakovic, 2009).

In this sense, musical scores can be considered as an example of a document and information object, as they go through representation processes in order to be retrieved and accessed. When talking about location, Dougan (2006) adds that they are mostly affiliated to universities or cultural institutions, especially historical scores that have not been made available by netizens. Such an affiliation allows the score and its history to be preserved. Other barriers to localization that affect representation and retrieval are the possibility of a score being poorly written or in an online database that searches cannot access, such as the deep web. For this reason, Dubnjakovic (2009) states that the quality of musical score storage sites should be addressed, as well as the editions available, breadth of the collections, visual appearance and functionality. Dubnjakovic explains that establishing criteria is important with digital musical score content that is generally hosted by individuals, libraries, societies, professional organizations or companies and the media.

According to Dougan (2006), describing musical scores for representation purposes can be a complex and arduous process for two reasons: (1) the incompleteness of the metadata associated with these scores and (2) netizens’ lack of knowledge – in particular, their inability to develop strategies to carry out effective searches. Dougan explains that although netizens often search by title or keywords, the approach they use may not lead them to the desired result. Also according to Dougan, the interface and search bars are considered additional challenges when searching for musical scores, especially if they are free. This was identified as a concern by the librarian community as early as 2006, and continues to be a problem today, since all of these factors impact the representation and retrieval of musical scores, as well as the overall accuracy of the user experience when searching.

Given this context and the concern with score representation and retrieval explained by other authors, the following question was developed: How do digital environments carry out the process of indexing musical scores? In this regard, the study aimed to investigate how descriptions were formulated, what information was chosen, and what representative terms were assigned in the score indexing process. The research proposal was to carry out (1) a theoretical study of the process of indexing musical scores in order to understand how scholars discuss the topic and (2) an exploratory study of how digital environments (libraries, repositories and websites) choose which information and representative terms to represent scores, with the aim of observing how they carry out this practice. From this, the study aimed to propose improvements to the systems and recommendations to those in charge of the process of indexing musical scores to make search and retrieval more effective.

This research is justified on the basis of the investigations mentioned in this context (Dougan, 2006; Dubnjakovic, 2009) and the need to give musical scores adequate descriptive and thematic treatment in digital environments. Oliveira et al. (2017: 147) add that the ‘context of digital information production has demanded scientific research on forms of storage and appropriate tools to enable access to and use of information’ by netizens, which demonstrates the need for specific research of this nature.

Indexing of musical scores in digital environments

Musical scores originated when symbols began to be placed next to the lyrics of the songs of religious ceremonies at the beginning of the 9th century (Souza and Souza, 2014). In the 21st century, the best-known and most popular type of musical score is the Western score. Although its origin is not precise, there is consensus that it was directly influenced by the Benedictine monk Guido d’Arezzo (c.991–c.1033), who is considered to be the creator of the modern musical score (Bairral, 2010).

Musical scores are defined as ‘graphic representations of sounds and the instructions for playing them, made on paper’ or in digital format (Gandelman, 2003: 1). For McLane (1996), they are composed of their own features and functions, which provide a
standardized guide for all musicians when performing a piece.

The information contained in a musical score is presented in the details of its structure, as these details disclose the process and moment of its creation (such as the title date), stave, tonality, lyrics and notes (Torres Mulas, 2000). This set of elements reveals what information makes up a score and its functions, which are important both for its execution by a musician and for obtaining knowledge to carry out the indexing process.

The indexing process is made up of sub-processes that will identify the content of a given document, such as a musical score. These sub-processes can be divided into examining the document and establishing the subject of its content; identifying the concepts present in the subject; and translating the concepts into indexing language terms (International Organization for Standardization, 2011; Lancaster, 2003). The aim is to represent documents in analogue and digital information environments thematically.

Musical scores require the same procedures as textual documents. However, they differ in that they contain symbols (notes, clefs, stave, tonality, time signature, etc.) and text (title, date, composer, lyricist, etc.), which turns them into both a textual and a visual document, and greater care is therefore required when carrying out indexing procedures. Dubnjakovic (2009) explains that the need to focus on the process of indexing musical scores is due to the demands that have arisen in the development of technology and the fields of music and information science itself. With the explosion of information technologies and resources, such as the Internet, netizens and librarians now require new tools for searching, representing and retrieving information, especially in digital environments.

According to Faria (2009), the process of indexing a score is challenging due to the lack of knowledge of the music field on the part of most information professionals (indexers, librarians, archivists) to meet the information needs of musicians, such as the recurring symbology in scores. On the other hand, musicians lack knowledge of the library and information science techniques and methodologies to carry out the indexing process effectively.

During the indexing process, the indexer should understand both the graphic and textual elements of the musical score, as recognizing the functions and significance of each symbol is crucial for retrieval. In this sense, Souza and Souza (2014) explain that the descriptive elements (title, composition, data, copyists, notes, symbols, instrumentation) can be checked in different parts of the structure (cover and header, top or bottom). They stress the need for this specialized knowledge to carry out the representation, as the information is not always obvious, which poses additional challenges for the indexer. According to Smiraglia (2001) and Dougan (2006), librarians must determine what to use for representation. In the context of music, the subject can vary based on the structure of the musical score. Librarians might not be familiar with the title or composer but may recognize the first line of the composition, which requires additional tools for the indexing process.

According to Cavalcanti and Carvalho (2011), the process of analysing a score for representation can fail as the textual sources of a score may not be sufficient or clear enough to identify information during the indexing procedure. They list the thematic and descriptive elements, without making a distinction: original title, translation into another language, authorship, date of the work’s composition, biographical features of the author, publisher, printing, edition and fingering, collection/series, period, genre, nature of the characteristics of the work and format.

One way to improve the process of indexing musical scores is to implement and adopt metadata as a complement, as it can improve the representation and impact score retrieval in digital environments. For Sasser (2009), the use of metadata by information professionals is essential, as its thoroughness enables netizens to locate and interpret their needs. Consequently, metadata should adequately represent the specialized and unique features of musical scores, since information professionals do not usually describe scores at the item level, but by collections represented by composers, lyricists and other types of creators (Riley and Dalmau, 2007).

According to Riley and Dalmau (2007), representation should be based on a created metadata model and contain the following descriptive and thematic elements: title of the score, name or creator, composer, arranger, lyricist and dedication or performer dates (copyright, date of publication or if there is no date); cover art; subjects (lyric language, form, genre and style); instrumentation; and geographical information. Carrying out the score indexing process requires that the most significant elements of the musical score and its structural analysis be considered, as adopting these elements allows other facets of the score’s analysis to be achieved (social, aesthetic, sociological and historical reflections; Cavalcanti and Carvalho, 2011).

The theoretical basis discusses important points in the literature on indexing musical scores that have been under discussion since the beginning of the 21st century, including the definition of scores, what
the thematic and descriptive elements are and their meanings, access to and availability of scores on the Internet, how the indexer makes choices for thematic representation and the procedure itself.

**Methodological procedures**

This research is characterized by methodological procedures consisting of exploratory and descriptive analyses, the purpose of which was to observe the process of indexing musical scores in digital environments. In order to investigate the process of representing and retrieving musical scores, the study was divided into three stages: (1) the theoretical foundation, derived from bibliographic research through published literature; (2) the selection of an analysis matrix in which musical scores are stored and made available, and the creation of categories for analysis; (3) data collection and analysis through the search and retrieval of scores.

In the theoretical foundation stage, a bibliographic search was carried out in different databases: BRAPCI – Database in Information Science, Directory of Open Access Journals, Google Scholar, and Library, Information Science and Technology Abstracts. The terms used in the searches were ‘indexing’ AND ‘musical score’; ‘organization’ AND ‘musical score’; ‘representation’ AND ‘musical score’; and ‘musical score’. The time frame was 2000–2023. However, there was research from earlier than 2000 that proved to be important, such as the study by McLane (1996).

In the second stage, the selection of the analysis matrix and the creation of the categories were carried out together as they are interlinked. Dubnjakovic’s (2009) study developed a list of websites divided into categories, which was incorporated into the study as a way of deepening the research and analysis of the repositories (see Table 1). The categories drawn up by Dubnjakovic (2009) are: (1) individually produced websites; (2) library websites; (3) professional society and organization websites; and (4) company-sponsored websites.

The repositories shown in Table 1 were chosen based on observation while exploring the Internet. The following aspects were analysed: categories and subcategories and their access (based on the search and retrieval of scores) and representative terms. Of the 17 repositories selected, two were unstable and prevented analysis of the search results. However, the organizational structure of their interfaces was noteworthy and interesting enough to be discussed in the results.

The third stage was the analysis of the results based on searches carried out in these information environments to verify how the scores were retrieved. The representative term used was ‘Clair de lune’, a piano score composed by Claude Debussy in 1905.

**Results**

The repositories were analysed and divided into the four categories developed by Dubnjakovic (2009) in his study: individually produced websites and library websites had five repositories each; professional society and organization websites had four repositories; and company-sponsored websites had three repositories.

<table>
<thead>
<tr>
<th>Repository</th>
<th>Web address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partitions</td>
<td><a href="http://anaigeon.free.fr/partitions.html">http://anaigeon.free.fr/partitions.html</a></td>
</tr>
<tr>
<td>Mfiles</td>
<td><a href="https://www.mfiles.co.uk/sheet-music.htm">https://www.mfiles.co.uk/sheet-music.htm</a></td>
</tr>
<tr>
<td>SuperPartituras</td>
<td><a href="https://www.superpartituras.com.br">https://www.superpartituras.com.br</a></td>
</tr>
<tr>
<td>ABC Music</td>
<td><a href="https://www.abc.net.au/abcmusic">https://www.abc.net.au/abcmusic</a></td>
</tr>
<tr>
<td>Sheet Music Catalog (University of South Carolina)</td>
<td><a href="https://sheetmusic.library.sc.edu">https://sheetmusic.library.sc.edu</a></td>
</tr>
<tr>
<td>Sheet Music Consortium</td>
<td><a href="https://digital.library.ucla.edu/sheetmusic/">https://digital.library.ucla.edu/sheetmusic/</a></td>
</tr>
<tr>
<td>British Columbia Sheet Music</td>
<td><a href="https://bcsheetmusic.ca">https://bcsheetmusic.ca</a></td>
</tr>
<tr>
<td>Repository Collections &amp; Archives (Duke University Libraries)</td>
<td><a href="https://repository.duke.edu/dc/hasm">https://repository.duke.edu/dc/hasm</a></td>
</tr>
<tr>
<td>São Paulo University Collections</td>
<td><a href="https://colecoes.abcd.usp.br/partituras/">https://colecoes.abcd.usp.br/partituras/</a></td>
</tr>
<tr>
<td>CCARH Publications (Center for Computer Assisted Research in the Humanities, Stanford University)</td>
<td><a href="http://www.ccarih.org/publications/">http://www.ccarih.org/publications/</a></td>
</tr>
<tr>
<td>Mutopia Project</td>
<td><a href="https://www.mutopiaproject.org">https://www.mutopiaproject.org</a></td>
</tr>
<tr>
<td>Thematic Entries to Project Runeberg (TEMA)</td>
<td><a href="https://runenberg.org/tema/music.html">https://runenberg.org/tema/music.html</a></td>
</tr>
<tr>
<td>Gutenberg Project</td>
<td><a href="https://www.gutenberg.org/browse/categories/4">https://www.gutenberg.org/browse/categories/4</a></td>
</tr>
<tr>
<td>Music Scores</td>
<td><a href="https://www.music-scores.com">https://www.music-scores.com</a></td>
</tr>
<tr>
<td>Music Editions, by Christoph Dalitz</td>
<td><a href="http://music.dalitio.de">http://music.dalitio.de</a></td>
</tr>
<tr>
<td>Musicstudents.com</td>
<td><a href="http://www.musicstudents.com">http://www.musicstudents.com</a></td>
</tr>
</tbody>
</table>

Table 1. List of repositories analysed in the research.
repositories. In order to analyse how the score representation and retrieval took place, we looked at the categories and subcategories made available by them (see Figure 1), the representative terms attributed in the metadata (see Table 2), and the relationship between the general categories presented by the repositories and the categories developed by Dubnjakovic (2009; see Table 3).

In total, 133 categories and subcategories were found in the repositories analysed. Of these, 11 appeared more frequently in at least three different repositories. The ‘composer’ category, for example, appeared in nine different repositories and can therefore be characterized as an essential element, given the significant number of repositories that used this category as an element for retrieving scores. ‘Title’, ‘genre’, ‘format’ and ‘author’ appeared in five different repositories and can also be regarded as essential categories, like ‘composer’. There is a necessary issue to consider in relation to the ‘author’ category; it is presented in a generic way and it is therefore not possible to know who ‘author’ refers to – the composer, lyricist, editor or arranger, for example. The same can be said for the ‘name’ category, which does not appear in Figure 1 because it was used in only two repositories. Both categories

Figure 1. Most frequent categories and subcategories.

Table 2. Representative terms identified in the repositories.

<table>
<thead>
<tr>
<th>Repository</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gutenberg Project</td>
<td>American drama</td>
<td>Text</td>
<td></td>
</tr>
<tr>
<td>SuperPartituras</td>
<td>Classical (genre)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mutopia Project</td>
<td>Classical and modern (genre and period)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>São Paulo University Collections</td>
<td>Instrumental</td>
<td>Music</td>
<td>Five</td>
</tr>
<tr>
<td>Sheet Music Catalog</td>
<td>Piano music</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ABC Music</td>
<td>Popular (music style)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Music Scores</td>
<td>Weddings (genre)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Relationship between general categories and types of repository.

<table>
<thead>
<tr>
<th>Dubnjakovic’s (2009) website categories</th>
<th>General categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individually produced websites</td>
<td>Composer, title, genre, format, theme, author, periods, electronic music, classical links, instrument, difficulty, views, melody, playing, artist, pages</td>
</tr>
<tr>
<td>Library websites</td>
<td>Title, collection, language, subject, format, year, composer, author, location, genre, contributors, publisher, text, notes, data, LCSH, place, simple and advanced search, names, house, library, means of expression</td>
</tr>
<tr>
<td>Professional society and organization websites</td>
<td>Composer, collection, author, title, genre, format, language, subject, function, manuals, magazines, books, donations, period, instrument, musical styles</td>
</tr>
<tr>
<td>Company-sponsored websites</td>
<td>Composer, genre, theme, classical, traditional, jazz, blues, exercises, number, voice, keywords or phrases</td>
</tr>
</tbody>
</table>

Note. LCSH: library of congress subject headings.
could be considered synonymous. However, the absence of specificity prevents the determination of what role the person responsible for the score played, and makes categorization difficult.

A similar situation occurred with the categories ‘genre’ and ‘subject’, which were also used by few repositories. ‘Genre’ can vary according to the context in which it is used, due to the complexity and scope of the term. In this study, as a category, it refers to musical styles (jazz, samba, rock, classical, etc.). When analysed, it can be verified that it is similar to ‘musical style’ – another category that does not appear in Figure 1 due to it not being used in many repositories, but which is referred to in the same way as ‘genre’. The categories of ‘subject’ and ‘theme’ can also lead to misunderstandings, as they can be used as synonyms for ‘genre’ and ‘musical style’ at the time of representation. This can be observed when searching for the musical score ‘Clair de lune’ by Claude Debussy in the following repositories: Music Editions, Music Scores, Mutopia, São Paulo University Collections and SuperPartituras. The terms in the ‘subject’ category are almost the same as those assigned to ‘genre’. Smiraglia’s (2001) and Dougan’s (2006) studies support this observation in explaining that ‘subject’ can vary according to the structure of the musical score and the level of knowledge of the professional, which can cause discrepancies and variations in representation.

In order to compare the categories and attributed elements, the score records were accessed to check which representative terms were attributed to the ‘Clair de lune’ score (see Table 2).

Table 2 shows that only seven repositories had representative terms – less than half of the analysed repositories. São Paulo University Collections had the most terms (3) with ‘instrumental’, ‘music’ and ‘five pages’, followed by the Gutenberg Project (2) with ‘American drama’ and ‘text’. The remaining repositories had only one term: SuperPartituras with ‘classical (genre)’; Mutopia Project with ‘classical and modern (genre and period)’; Sheet Music Catalog with ‘piano music’; ABC Music with ‘popular (music style)’; and Music Scores with ‘weddings (genre)’. There are similarities and differences across the assigned terms, with some being very specific (‘weddings (genre)’, ‘American drama’, ‘five pages’) and others being more generic (‘popular (music style), ‘music’). The choice of these terms raises the possibility of questioning the existence of the use of controlled vocabularies – an essential stage in the indexing process (International Organization for Standardization, 2011; Lancaster, 2003) – and the challenges generated by the procedure for the person responsible for indexing (Faria, 2009). Despite this, establishing guidelines for decision-making and using metadata can help establish the elements due to their completeness and ability to provide adequate representations (Sasser, 2009).

In order to verify the relationship between the most frequent categories in the analysis matrix and the website categories developed by Dubnjakovic (2009), the data was cross-referenced (see Table 3). The italicized categories shown in Table 3 appeared most frequently and, from Figure 1, it can be observed that all types of repositories used them. It is therefore clear that the way in which guidelines and objectives are established can affect the entire development of a repository and its categories.

Company-sponsored websites presented repositories with the smallest number of categories and with musical specificity considered more expressive, such as ‘jazz’, ‘blues’ and ‘classical’, which are different music styles. On the other hand, library websites had repositories with a large number of categories, some of which were very generic, such as ‘house’ and ‘library’. Nevertheless, they were still the most complete in their choices, as they presented 10 of the 11 categories that appeared most frequently. As these are both public and private university institutions, it is unclear whether they use additional tools to control vocabulary. Although not entirely effective, these tools help to improve representation and retrieval (Dougan, 2006; Smiraglia, 2001).

Determining what each category will cover can ensure that there are fewer flaws in the representation and less confusion for netizens when trying to retrieve a score. Therefore, in order to better develop this type of digital environment, those in charge of the process need to have in-depth knowledge of music and indexing processes, so that they can work with both areas together (Faria, 2009; Souza and Souza, 2014). To this end, establishing guidelines for making decisions, ranging from a repository’s information architecture to the function of each category and even the sub-processes of indexing (International Organization for Standardization, 2011; Lancaster, 2003), can bring improvements and make repositories efficient in representing and retrieving scores. These choices can be formalized as policies and instructions, and made available to both those in charge of the process and netizens.

When analysing the literature and the selected categories, it can be seen that themes and standardization are essential for score representation and retrieval. The representative elements presented by the authors in the theoretical background corresponding
to the categories analysed in the repositories were ‘title’ (Cavalcanti and Carvalho, 2011; Riley and Dalmau, 2007; Souza and Souza, 2014; Torres Mulas, 2000), ‘composition’ (Souza and Souza, 2014), ‘composer’ (Dubnjakovic, 2009; Riley and Dalmau, 2007), ‘author’ (Cavalcanti and Carvalho, 2011), ‘instrumentation’ (Souza and Souz, 2014), ‘collection’ (Cavalcanti and Carvalho, 2011; Riley and Dalmau, 2007), ‘genre’ (Cavalcanti and Carvalho, 2011), ‘format’ (Cavalcanti and Carvalho, 2011) and ‘subject’ (Riley and Dalmau, 2007). When analysing these elements, it is clear that there is not a complete consensus on the number of categories and which should be considered for the indexing process. Some authors present a larger number (Cavalcanti and Carvalho, 2011; Souza and Souza, 2014), while others present a smaller number (Riley and Dalmau, 2007; Torres Mulas, 2000), focusing on the title and those responsible for developing the score, respectively.

In the process of analysing the repositories, all the categories showed that, at different levels, they resemble, differ from or complement each other in either the descriptive or thematic elements pointed out by the authors in the literature (Cavalcanti and Carvalho, 2011; Dubnjakovic, 2009; Riley and Dalmau, 2007; Souza and Souza, 2014; Torres Mulas, 2000). Each repository was developed with its own specific objectives to reach a target audience. Despite the positive aspects, the attribution of representative terms can be considered scarce and ineffective, due to the repositories’ low adherence to the procedure, as evidenced by the lack of terms in their records. The representative terms were at two extremes: on the one hand, they were too generic (‘music’, ‘text’); on the other, they were too specific (‘American drama’, ‘weddings (genre’) ). The few repositories that did assign terms gave rise to questions about the use of some kind of vocabulary-control tools, which diverges from another question posed above, since the library website repositories presuppose the use of controlled vocabulary due to the categories they present.

Conclusion

The investigation of musical scores in different digital environments has provided a visualization of the details of how they perform in search and retrieval, the representative terms assigned, and their accessibility.

At first, there is no explicit information on the functioning, access or indexing process of the analyzed matrix. Although empirical browsing offers levels of understanding, it can often be a significant challenge, with recurring problems when searching for musical scores, especially if there is no knowledge of indexing or music. The analysis shows that only a small number of the sample assigned representative terms, ranging from the most generic to the most specific possible, which raises the question of whether vocabulary-control tools are used and why other repositories do not use them.

Both the literature presented and the results discuss professionals’ lack of knowledge, as well as structure and stability. Developing guidelines and using metadata can be solid solutions for improving the representation and retrieval of musical scores.

Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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Abstracts

Understanding the US Library Diplomacy Practices in the 21st Century

Fleming, R.

This study investigates the role of US libraries in promoting cultural exchange and understanding in the 21st century. It explores how US libraries have adapted to new technologies and international relations to facilitate cultural diplomacy.

Librarians’ role in the preservation and dissemination of indigenous knowledge

This paper examines the role of librarians in preserving and disseminating indigenous knowledge. It highlights the importance of librarians in preserving cultural heritage and the challenges they face.

Al-Generated Content Tools and Students’ Critical Thinking: Insights from a Chinese University

This paper discusses the use of AI-generated content tools in higher education and their impact on student critical thinking. It provides insights from a Chinese university setting.
Professional qualifications, accreditation, and certification in LIS schools: a global perspective

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AI-Generated Content Tools and Students' Critical Thinking: Insights from a Chinese University

邹小筑 (Xiaozhu Zou) 、苏萍 (Ping Su) 、李乐兴 (Lexing Li) 、傅平 (Ping Fu)
IFLA Journal, 50-2, 228-241

摘 要:

本文旨在探究人工智能内容生成工具对学生的批判性思维能力的影响以及他们的态度。本研究对中国一所大学的851名学生进行调查，了解他们对这些工具的使用模式、使用动机、感知的利益和风险意识，以及对批判性思维能力的重视程度。同时，本文还探讨了批判性 thinker和图书馆员如何帮助学生培养批判性思维能力。研究数据显示，男性和非二元性别学生更频繁地使用人工智能工具，突显了研究领域的一个空白。研究揭示了节约时间和精力等动机，同时也表明学生对风险和局限性有一定的认识，强调了在使用人工智能内容生成工具时具备批判性思维能力的必要性。研究结果对高校图书馆具有重要意义，因为学生表达了对人工智能素养和批判性思维教育和培训的渴望。图书馆可以提供资源、研讨会和指导，以增强学生的认知和批判性思维实践能力。

Professional qualifications, accreditation, and certification in LIS schools: a global perspective

图书馆与信息科学学院的专业资格与认证：全球视角

法提赫·奥古兹 (Fatih Oguz) 、克里斯·康宁汉 (Chris Cunningham) 、努里亚·鲍蒂斯塔-普伊戈 (Nuria Bautista-Puig) 、蒂亚戈·布拉加 (Tiago Emanuel Nunes Braga)
IFLA Journal, 50-2, 257-272

摘 要:

图书馆与信息科学学院及其认证在培养个人成为高效且称职的图书馆员与信息科学专业人员方面发挥着至关重要的作用。已有多项研究旨在分析特定背景下(例如国家)图书馆与信息科学专业人员的认证标准和流程。然而，全球视角下的相关研究仍然有限。本文简要介绍了世界各地图书馆与信息科学专业人员的资质，以及世界范围内图书馆与信息科学学院的认证情况。作者采用非概
The impact of multimedia in academic information literacy instruction in libraries

多媒体对图书馆学术信息素养教育的影响

霍泽法·拉姆加德瓦拉 (Hozefa Ramagdwa)
IFLA Journal, 50-2, 273-291

摘要：

本研究旨在分析多媒体对高等教育领域学术信息素养的影响。本文探讨了信息和通信技术的发展如何影响学术信息素养偏好和教学方法。最后，本文讨论了多媒体对教学方法的当前影响和未来趋势。作者面向英国、肯尼亚和印度三个国家的高校学生展开调查，以了解图书馆内多媒体的过渡，目的在于确定行为特征、学术或艺术天赋（语言或视觉倾向）和大学的地理位置是否影响多媒体学习。研究结果不支持能力倾向—治疗相互作用（ATI理论）。在目前的背景下，不同的学习方法，无论具有学术天赋还是艺术天赋，都需要不同类型的教学方法来优化学习，但调查发现，学生的选择并不影响他们对教学方法（口头/视频教学）的选择。研究结果还显示，大学的地理位置对学习能力有促进或阻碍作用。

Knowledge management for climate change in South Africa: A proposed strategy

南非气候变化知识管理：建议策略

玛德琳·福姆巴德教授 (Madeleine C Fombad Prof)
IFLA Journal, 50-2, 292-309

摘要：

本文探究了南非的气候变化知识管理，并提出了气候变化知识管理策略。据预测，气候变化在经济、政治、社会和生态层面将对该国的国家发展计划和可持续发展构成威胁。鉴于人们对可持续发展知识的日益重视以及知识在适应能力与缓解气候变化方面的重要性，知识管理已成为全球各国政府和非政府机构应对气候变化的核心战略。气候变化的影响以及南非缺乏对气候变化知识管理的关注，使之成为一个重要的话题。本文对有关知识管理和气候变化的教科书、文章、策略、框架和立法进行了系统的文献检索和内容分析。作者以气候变化、知识管理与策略为关键词，在Scopus、ProQuest、EBSCO、Science Direct、Emerald、Elsevier、TaylorandFrancis、Springer、Wiley和Iniderscience等数据库中进行检索，以确保全面覆盖，并对检索结果进行了有效性评估。在删除了2900个不完全涉及研究范围的无重复条目后，作者完成了对100篇相关文章的描述性整合。最后提出了一项气候变化知识管理策略，呼吁建立一个气候变化知识管理中心。

Exploring the research domains and gender gap in LIS doctoral research

图书馆与信息科学博士学位研究领域与性别差异探析

马利卡尔琼·多拉 (Mallikarjun Dora)、卡纳加撒拜 (Kanagasabai K)、拉夫吉·扎拉 (Lavji N Zola)、拉什·卡姆巴 (Raj Kishor Kampa)
IFLA Journal, 50-2, 310-321

摘要：

本文旨在从研究领域、性别差异和劳动力市场等角度分析印度的图书馆与信息科学博士学位研究。作者利用印度研究论文和学位论文数据库Sodh-ganga检索博士论文信息，并利用Jarvelin&Vakkar#20998;类系统对博士论文研究主题进行分类。随后，作者使用IBM SPSS和Tableau对2016年至2020年间授予的808篇博士学位论文进行了分析。研究结果显示，图书馆与信息科学领域的博士研究呈上升趋势，每年有150人获得该专业博士学位。研究还发现，信息检索（33.8%）、图书馆和信息服务活动（30.7%）以及科学与专业交流（16.5%）是博士生的首选研究主题。此外，研究结果表明，获得博士学位的男性多于女性，博士学位的数量存在性别差异。拥有博士学位的图书馆与信息科学专业人员的就业率最高，为96.2%，大多就职于政府部门。

When a disaster strikes: Are libraries in the Philippines ready?

当灾害来临：菲律宾的图书馆准备好了吗？

达里尔·苏必利尔 (Daryl Lustracion Superio)、约瑟夫·亚普 (Joseph Marmol Yap)、朱菲尔·塞比尔—基纳奥 (Jufel Ma. Lourdes Sebial-Guinaan)、罗林格尔·卡利隆 (Rollinigel Calilung)
IFLA Journal, 50-2, 322-340

摘要：

菲律宾图书馆经常受到自然灾害或人为灾害的威胁。本研究采用混合方法，涵盖了由全国90名图书馆馆长或有关负责人开展的详细调查，共分为七部分。研究结果表明，许多图书馆在过去十
Research data management in selected East African libraries: A survey

苏巴维拉潘狄扬 (Subaveerapandiyan A)、杰里米亚·乌格乌勒博 (Jeremiah Emeka Ugwulebo)
IFLA Journal, 50-2, 341-353

摘要：

本文调查了选定东非图书馆的专业人员对研究数据管理和服务的了解。作者采用调查研究设计，使用结构化问卷从四个东非国家——马拉维、莫桑比克、赞比亚和津巴布韦的180名受访者中收集数据。调查显示，东非馆员中，只有31.1%表示其图书馆提供研究数据管理服务。这些图书馆提供的标准研究数据管理服务包括数据发布、共享和再利用，同时与学术机构合作被认定为培养研究数据管理技能的重要途径。本文强调，图书馆员有必要培养法律、政策和咨询技能，了解机构内外的资源以及有效提供研究数据管理服务所需的研究活动。

Information competency assessment of undergraduates: A Pakistani perspective

巴基斯坦视角下的大学生信息能力评估

那哈·伊凡 (Naha Irfan)、穆哈默德·拉菲 (Muhammad Rafiq)、穆哈默德·阿里夫 (Muhammad Arif)
IFLA Journal, 50-2, 354-364

摘要：

具备信息能力的学生能够更好地使用他们所掌握的大量数据，并且具有批判性和创造性思维。本文旨在通过分析一所一流大学本科生的信息能力来探讨巴基斯坦高等教育的研究差距。作者对669名本科生进行了横断面调查，并使用描述和推理统计数据做出推论。研究发现，学生对自身信息能力的感知略高于平均水平，性别或学年差异并不显著。学科领域显著预测了学生的信息能力水平，工科学生比其他学科的学生表现出了更高的信息能力。社会科学组的学生与其他五组相比，信息能力较弱。本研究填补了文献空白，并为学者和图书馆从业者提供了为大学生创建有效的数字和信息素养计划的重要方法。

Redefining academic library work: Telecommuting potential in post-COVID Ghana

重新定义高校图书馆的工作：加纳在后疫情时代的远程办公可能性

威尔赫米纳·奥弗里 (Wilhemia Odarkor Ofiri)
IFLA Journal, 50-2, 365-376

摘要：

以往，由于图书馆员的职责要求进行面对面互动，或者由于他们的工作材料存放于办公场所，所以他们被限制在物理空间内。随着图书馆和图书馆员的工作流动性越来越高，许多工作都可以便捷地在任何场所以笔记本电脑完成。本文研究了加纳高校图书馆员对远程办公的看法以及在加纳实施远程办公的可能性。作者采用了探索性案例研究设计，以问卷形式对57名受访者进行了调查。结果显示，高校图书馆员倾向于远程办公，并愿意每周至少远程办公一次。此外，灵活的工作时间和通勤时间的减少也带来了更大的好处。然而，管理层对正式实行远程办公的触手是可能遇到的一个主要挑战。

The current state of continuing professional development (CPD) of academic librarians, and the roles of CPD providers in Thailand

泰国高校图书馆员持续职业发展的现状以及持续职业发展提供方的角色

舒提玛·萨查南德 (Chutima Sacchanand)、尼洛本·威莫斯提查 (Nilobon Wimolsittichai)、奥拉潘·康孔赛 (Orapan Kankonsue)、瓦拉克·帕他那起亚蓬 (Wararak Pattanakiatpong)
IFLA Journal, 50-2, 377-393

摘要：

本文采用混合方法探讨了泰国高校图书馆员持续职业发展的现状以及持续职业发展提供方的角色。作者对243名泰国高校图书馆员进行了在线调查，并对20名馆长和副馆长进行了深入
Effect of humble leadership on knowledge sharing, change and ethnicity in Iranian public libraries

谦逊领导力对伊朗公共图书馆知识共享、变革和种族的影响

玛赫西-埃特玛西 (Mahshid Eltemasi)、萨米拉-阿拉米 (Samira Arami)
IFLA Journal, 50-2, 394-407

摘要：
本文探讨了谦逊领导力对伊朗公共图书馆知识共享和适应能力的影响，重点关 注种族多样性。作者采用定量方法和相关性研究，利用群体随机抽样方法，对伊朗不同种族背景的公共图书馆工作人员进行了调查。结果表明，谦逊领导力对图书馆工作人员的适应和知识共享意愿产生了积极影响。此外，一项采用Kruskal-Wallis测试的分析显示，谦逊领导力的一个方面——“承认个人局限性”——与种族只有微弱的联系。有趣的是，伊朗的阿拉伯族裔对谦逊领导力表现出的偏好较低，但不同种族背景的员工之间的知识共享和适应能力有所提高。这项研究开辟了新的领域，同时分析了与谦逊领导力有关的各种变量，包括种族。研究结果对于公共图书馆的管理具有重要意义，突出了有效沟通和同理心在减少员工对知识共享和组织变革的抵触方面的重要意义。

Musical score representation and retrieval in digital environments

数字环境下的乐谱表示与检索

杰西卡-托拉雷 (Jessica Beatriz Tolare)、玛丽安杰拉-弗吉塔 (Mariângela Spotti Lopes Fujita)、法比亚诺-卡斯特罗 (Fabiano Ferreira de Castro)
IFLA Journal, 50-2, 408-415

摘要：
本文旨在分析用户或机构、数据库和数字图书馆在各种数字环境(如乐谱存储网站)中提交的乐谱的表示和检索。文章探讨了这些界面的特征，并观察了乐谱如何按主题来表示。作者采用探索性研究方法来检索乐谱，并通过描述性研究来分析这些环境中的主题表示。结果显示，这些网站是按类别分类的，便于用户搜索乐谱。所分析的网站在全面性和组织性方面各不相同，但在索引方面具有相似特征。因此，本文主张在其结构、组织、语言和系统以及专业培训等方面增加投入。

Understanding the US Library Diplomacy Practices in the 21st Century

Comprendre les pratiques diplomatiques bibliothécaires américaines au XXIe siècle

Randolf Mariano
IFLA Journal, 50-2, 211-227

Résumé:
Cette étude de cas préliminaire approfondit les points de vue et les perspectives de 17 experts des bibliothèques américaines impliqués dans les pratiques diplomatiques bibliothécaires du XXIe siècle. L’analyse du modèle permet d’identifier quatre thèmes principaux de la diplomatie bibliothécaire: (1) les acteurs ont fait preuve de rôles implicites et explicites dans l’implication diplomatique; (2) le principal objectif de la diplomatie bibliothécaire était de faciliter le dialogue autour des connaissances; (3) les stratégies visaient à encourager l’humilité culturelle; et (4) les acteurs considéraient la numérisation comme un instrument essentiel du travail bibliothécaire international. Cette recherche offre une compréhension considérable du sujet, moins étudié, de la diplomatie bibliothécaire, notamment alors que les bibliothèques du XXIe siècle font face à un défi quant aux problèmes mondiaux liés à la liberté d’information; aux valeurs d’équité, de diversité, d’inclusion et d’accessibilité; et aux efforts en matière de durabilité. La diplomatie bibliothécaire doit plus que jamais être au centre de l’établissement du dialogue à travers le monde. L’étude encourage un approfondissement de l’examen des pratiques diplomatiques bibliothécaires dans un large éventail de contextes géographiques et internationaux.
Al-Generated Content Tools and Students’ Critical Thinking: Insights from a Chinese University

Outils de contenu généré par l’IA et pensée critique des étudiants: perspectives d’une université chinoise

Xiaozhu Zou, Ping Su, Lexing Li, Ping Fu

Résumé:
Cette étude examine l’impact des outils de contenu généré par l’intelligence artificielle sur l’esprit critique des étudiants et leurs attitudes à l’égard de ces outils. Une étude basée sur 851 étudiants d’une université chinoise a été menée pour examiner leurs modèles d’utilisation, leurs motivations, les avantages perçus et leur conscience des risques, ainsi que l’importance de leur esprit critique. L’étude explore également la manière dont les bibliothécaires et les bibliothécaires peuvent aider les étudiants à développer leur sens critique. Les découvertes effectuées révèlent que les étudiants de sexe masculin et non binaires utilisaient les outils d’intelligence artificielle plus fréquemment, mettant en lumière un fossé dans la recherche. L’étude dévoile des motivations comme le gain de temps et d’efforts. Elle montre également que les étudiants sont conscients des risques et des limites de ces outils de contenu généré par l’intelligence artificielle, soulignant la nécessité d’un esprit critique pour les utiliser à bon escient. Ces découvertes ont des implications considérables pour les bibliothécaires universitaires, les étudiants exprimant leur soif d’apprentissage et de formation à l’intelligence artificielle et à la pensée critique. Les bibliothécaires peuvent fournir des ressources, des ateliers et une assistance pour permettre aux étudiants de pratiquer une pensée informée et critique.

Librarians’ role in the preservation and dissemination of indigenous knowledge
Le rôle des bibliothécaires dans la préservation et la propagation de connaissances indigènes

Josilene Chigwada, Patrick Ngulube

Résumé:
À l’ère de l’innovation numérique, la préservation des connaissances indigènes se trouve à un carrefour incontestable, entre héritage et technologie. Les bibliothécaires jouent un rôle essentiel dans la navigation à travers les complexités de la technologie, tout en respectant les protocoles culturels. Grâce à une exploration complète des pratiques bibliothécaires, cette étude a cherché à dévoiler de quelle manière les connaissances indigènes peuvent être préservées, sur le plan éthique, dans le paysage numérique. Une étude qualitative a été menée auprès de 20 bibliothécaires du Zimbabwe, sélectionnés à dessein. Les entretiens et les observations ont été utilisés pour collecter des données, qui ont été utilisés au moyen d’une analyse du contenu thématique. Les recherches révèlent que les bibliothécaires ont préservé des connaissances indigènes sous forme de poésie, de folklore, de théâtre et d’artefacts; elles ont organisé des représentations de danses traditionnelles; et elles ont parfois enregistré des sessions en direct et des collections particulières. Les principaux défis auxquels l’étude a dû faire face étaient les questions éthiques relatives à la documentation des connaissances indigènes. Les bibliothécaires devraient travailler activement avec les communautés indigènes dans les projets liés aux connaissances indigènes afin d’éviter toute résistance de la part des détenteurs de ces connaissances.

Professional qualifications, accreditation, and certification in LIS schools: a global perspective
Qualifications professionnelles, habilitation et certification dans les écoles BSI: une perspective mondiale

Fatih Oguz, Chris Cunningham, Nuria Bautista-Puig, Tiago Emmanuel Nunes Braga

Résumé:
Les écoles des bibliothèques et des sciences de l’information, ainsi que leurs habilitations, jouent un rôle essentiel dans la préparation des individus à devenir des professionnels compétents des bibliothèques et de l’information. Un certain nombre d’efforts ont été entreprise pour analyser les normes et procédures d’habilitation pour les professionnels des bibliothèques et des sciences de l’information dans un contexte spécifique (par ex. pays). Toutefois, les recherches sont limitées d’un point de vue mondial. Cet article offre une vue d’ensemble des qualifications des professionnels des bibliothèques et des sciences de l’information ainsi que de l’habilitation et de la certification dans les écoles des bibliothèques et des
révélé des multimédias. Les résultats de l'étude n'entraînaient pas l'aptitude d'interactions (théorie IAT). Dans le contexte actual actual, cela signifierait que différents apprenants, de nature universitaire/artistique, ont besoin de types d'enseignement différents pour optimiser leur apprentissage. Cependant, l'étude a révélé que la nature des étudiants n'influencait pas leur choix de méthode d'enseignement (verbale/vidéo). Elle a également dévoilé que l'emplacement de l'université facilitait/entravait les aptitudes d'apprentissage des étudiants.

The impact of multimedia in academic information literacy instruction in libraries

L'impact des multimédias dans l'enseignement des aptitudes d'information universitaires dans les bibliothèques

Hozefa Ramgadwala
IFLA Journal, 50-2, 273-291

Résumé:
Cette étude vise à comprendre l'impact des multimédias dans les aptitudes d'information universitaires (AIU) dans le secteur de l'enseignement supérieur (ES). Cet article examine la manière dont le boom de la technologie des informations et des communications (TIC) affecte les préférences et la pédagogie en matière d'AIU. Enfin, l'article se penche sur les tendances actuelles et à venir de l'impact des multimédias sur l'instruction pédagogique. Une étude a été menée auprès d'étudiants de l'enseignement supérieur (ES) dans trois pays (RU, Kenya et Inde) afin de comprendre le passage aux multimédias dans les bibliothèques. L'objectif était de déterminer si des attributs comportementaux, de nature universitaire/artistique (verbaliseurs/visualiseurs) et la géographie de l'université avaient un impact sur l'apprentissage des multimédias. Les résultats de l'étude n'ont pas révélé d'adhésion au concept de l'interaction aptitude-traitement (théorie IAT). Dans le contexte actuel, cela signifierait que différents apprenants, de nature universitaire/artistique, ont besoin de types d'enseignement différents pour optimiser leur apprentissage. Cependant, l'étude a révélé que la nature des étudiants n'influencait pas leur choix de méthode d'enseignement (verbale/vidéo). Elle a également dévoilé que l'emplacement de l'université facilitait/entravait les aptitudes d'apprentissage des étudiants.

Knowledge management for climate change in South Africa: A proposed strategy

Gestion des connaissances pour le changement climatique en Afrique du Sud: proposition de stratégie

Prof. Madeleine C Fombad
IFLA Journal, 50-2, 292-309

Résumé:
Cet article se penche sur la gestion des connaissances pour le changement climatique en Afrique du Sud et il propose une stratégie de gestion des connaissances pour le changement climatique. Selon les prévisions, les dimensions économiques, politiques, sociales et écologiques du changement climatique devraient représenter une menace pour le Plan de Développement National et pour le développement durable du pays. Étant donné l'accroissement croissant mis sur la gestion des connaissances pour le développement durable, l'importance des connaissances dans la capacité d'adaptation et l'atténuation du changement climatique, la gestion des connaissances a été une stratégie de réaction essentielle au changement climatique proposé par diverses agences gouvernementales et non gouvernementales à travers le monde. Les effets du changement climatique et le manque de focalisation sur la gestion des connaissances pour le changement climatique en Afrique du Sud en font un sujet d'étude important. Une étude systématique de la littérature et une analyse du contenu des manuels scolaires, des articles, des stratégies en termes de politiques, des cadres et de la législation sur la gestion des connaissances et le changement climatique ont été effectuées. Le changement climatique, la gestion des connaissances et les stratégies ont été mises en évidence dans les bases de données Scopus, ProQuest, EBSCO, Science Direct, Emerald, Elsevier, Taylor and Francis, Springer, Wiley et Inderscience pour garantir une couverture complète. L'éligibilité des articles récupérés a été évaluée. Après avoir supprimé 2900 doublons non pertinents qui n'abordaient pas totalement la portée de l'étude, une synthèse descriptive des 100 articles pertinents a été réalisée. Une stratégie de gestion des connaissances pour le changement climatique exigeant l'établissement d'un Centre des Gestion des Connaissances pour le Climat a été proposée.
Exploring the research domains and gender gap in LIS doctoral research

Exploration des domaines de recherche et de l’écart entre les genres dans la recherche doctorale en BSI

Mallikarjun Dora, Kanagasabai K, Lavji N Zala, Raj Kishor Kampa

IFLA Journal, 50-2, 310-321

Résumé:
La présente étude a pour objectif d’analyser les domaines de recherche, l’écart entre les genres et les perspectives sur le marché de l’emploi dans la recherche doctorale en BSI en Inde. Sodghanga, un dépôt numérique de thèses et de mémoires indiens, a été utilisé pour extraire des informations sur les thèses doctorales et le système de classification Jarvelin & Vakkari a été utilisé pour catégoriser les sujets des recherches doctorales. Au total, 808 mémoires de doctorat décernés entre 2016 et 2020 ont été analysés au moyen d’IBM SPSS et de Tableau. Les résultats de l’étude ont révélé que la croissance de la recherche doctorale dans les BSI présente une tendance à la hausse avec 150 doctorats décernés dans les BSI chaque année. La recherche d’informations (33,8%), les activités des bibliothèques et des services d’information (30,7%) et la communication scientifique et professionnelle (16,5%) se sont avérées être les thèmes de recherche favoris des étudiants en doctorat pendant la période de l’étude. En outre, l’étude a révélé un écart entre les genres dans le nombre de doctorats conférés, plus d’hommes que de femmes recevant ces diplômes. Les professionnels des BSI possédant un doctorat ont le taux d’emploi le plus élevé avec 96,2% et la plupart occupent des postes dans la fonction publique.

When a disaster strikes: Are libraries in the Philippines ready?

Lorsqu’une catastrophe survient: les bibliothèques des Philippines sont-elles prêtes?

Daryl Lustracion Superio, Joseph Marmol Yap, Jufel Ma. Lourdes Sebial-Guinanao, Roilingel Calilung

IFLA Journal, 50-2, 322-340

Résumé:
Les catastrophes, qu’elles soient naturelles ou provoquées par l’homme, menacent fréquemment les bibliothèques des Philippines. Au moyen d’une approche à méthodes mixtes, cette étude impliquait une étude détaillée en sept parties à laquelle ont participé 90 responsables de bibliothèque ou fonctionnaires responsables dans l’ensemble du pays. Les résultats indiquent que de nombreuses bibliothèques ont été victimes de catastrophes au cours de la dernière décennie. Malgré cela, la plupart manquent d’une préparation adéquate, 69 fonctionnant sans plan de gestion des catastrophes. Ce manque de préparation est attribué à des contraintes telles que des finances et des ressources humaines limitées, entre autres, ainsi que l’impression que le risque induit par la catastrophe est faible. Si la plupart des bibliothèques ont mis en place des protocoles d’urgence de base, comme des systèmes d’alarme et des kits d’urgence, et si certaines ont une assurance et des organigrammes téléphoniques mis à jour en cas d’urgence, ces mesures sont loin de satisfaire aux exigences complètes pour gérer efficacement les catastrophes. L’étude souligne l’importance cruciale des plans de gestion des catastrophes, d’un équipe adéquat, de structures et de réseaux solides des bibliothèques pour la préparation et la gestion des catastrophes. Elle en appelle également à une action urgente pour la mise en application de la politique, la création de capacité et d’autres recherches visant à soutenir la résilience des bibliothèques face aux catastrophes potentielles.

Research data management in selected East African libraries: A survey

Gestion des données de recherche dans certaines bibliothèques sélectionnées d’Afrique de l’Est: une étude

Subaveerapandiyan A, Jeremiah Emeka Ugwulebo

IFLA Journal, 50-2, 341-353

Résumé:
Cet article se penche sur les connaissances en matière de gestion des données de recherche (GDR) et les services parmi les professionnels des bibliothèques d’Afrique de l’Est sélectionnées. Un concept d’étude a été utilisé et des données ont été collectées au moyen d’un questionnaire structuré rempli par 180 répondants représentant quatre pays d’Afrique de l’Est: Malawi, Mozambique, Zambie et Zimbabwe. Les résultats ont révélé que 31,1% seulement des bibliothécaires d’Afrique de l’Est sélectionnés ont déclaré que leurs bibliothèques institutionnelles...
fournissaient des services de GDR. Les services de GDR standard proposés par leurs bibliothèques incluaient la publication, le partage et la réutilisation de données, tandis que la collaboration avec des programmes universitaires a été identifiée comme une approche essentielle du développement de compétences de GDR. L’étude met en lumière la nécessité pour les bibliothécaires d’acquérir des compétences juridiques, politiques et consultatives, ainsi que des connaissances des ressources institutionnelles et extra-institutionnelles et du cycle de vie des recherches pour une prestation efficace des services de GDR.

**Information competency assessment of undergraduates: A Pakistani perspective**

**Évaluation des compétences en information des étudiants de licence: point de vue pakistanais**

*Naha Irfan, Muhammad Rafiq, Muhammad Arif*

*IFLA Journal, 50-2, 354-364*

Résumé:

Les étudiants qui possèdent des compétences en information sont mieux équipés pour utiliser la grande quantité de données à leur disposition et pour réfléchir de manière critique et créative. Cette étude a pour objectif d’aborder l’écart en termes de recherche au sein de l’enseignement supérieur pakistanais en examinant les compétences en information des étudiants de licence dans une université de premier plan. Une étude transversale a été menée auprès de 669 étudiants de licence, au moyen de statistiques descriptives et déductives afin de tirer des conclusions. L’étude a révélé que les étudiants percevaient leur compétence en information comme étant légèrement supérieure à la moyenne, sans différence notable sur la base du genre ou de l’année universitaire. Le domaine étudié permettait de prédire considérablement le niveau de compétence d’information, les étudiants en ingénierie exprimant des niveaux de compétence d’information supérieurs aux étudiants des autres disciplines. Le groupe des étudiants en sciences sociales a indiqué se sentir moins compétent en termes d’information que les cinq autres groupes. L’étude aborde l’écart en matière de littérature et propose des mesures essentielles afin que les universitaires et les praticiens des bibliothèques puissent créer des programmes d’aptitude numérique et d’information pour les étudiants des universités.

**Redefining academic library work: Telecommuting potential in post-COVID Ghana**

**Redéfinition du travail des bibliothèques universitaires: potentiel du télétravail dans le Ghana post-COVID**

*Wilhemina Odarkor Ofori*

*IFLA Journal, 50-2, 365-376*

Résumé:

Traditionnellement, les bibliothécaires ont toujours été limités à un lieu physique, soit parce que leur rôle exigeait une interaction en face à face, soit parce que leur matériel de travail se trouvait dans le bâtiment. Le travail des bibliothèques et des bibliothécaires devenant de plus en plus mobile, une grande quantité de travail peut être effectuée à partir d’un ordinateur portable, n’importe où. Cette étude a évalué les points de vue de bibliothécaires universitaires au Ghana concernant le télétravail et sa faisabilité dans le paysage ghanéen. Elle a employé un concept d’étude de cas préliminaire pour échantillonner au total 57 répondants à travers l’administration d’un questionnaire. Les résultats ont révélé que les bibliothécaires universitaires préféraient le télétravail et avaient envie de télétravailler au moins une fois par semaine. Ce système présente l’avantage supplémentaire d’offrir des horaires de travail flexibles et une réduction du temps de déplacement. La résistance du management à l’adoption formelle du télétravail était un défi majeur escompté.

**The current state of continuing professional development (CPD) of academic librarians, and the roles of CPD providers in Thailand**

**État actuel du développement professionnel continu (DPC) des bibliothécaires universitaires et rôles des prestataires de DPC en Thaïlande**

*Chutima Sacchanand, Nilobon Wimolsittichai, Orapan Kankonsue, Wararak Pattanañiatpong*

*IFLA Journal, 50-2, 377-393*

Résumé:

Cette étude s’est penchée sur l’état actuel du Développement Professionnel Continu (DPC) des bibliothécaires universitaires thaïlandais et sur les rôles des prestataires de DPC au moyen de méthodes mixtes. Un questionnaire en ligne auquel ont répondu 243
bibliothécaires universitaires thailandais ainsi que des entretiens approfondis avec 20 directeurs et sous-directeurs de bibliothèque ont été utilisés. Les données quantitatives ont fait l’objet d’une analyse descriptive, tandis que les données qualitatives ont été examinées par le biais d’une analyse thématique. Les résultats ont révélé que les bibliothécaires universitaires reconnaissaient l’importance de la participation à des activités de DPC et montraient une préférence pour le DPC en ligne, avec des prestataires « internes » et des réseaux de bibliothèques universitaires jouant des rôles significatifs. L’étude recommande une focalisation sur les compétences en IT et en anglais. En outre, l’étude montre la nécessité d’une assistance concise et dynamique pour les bibliothèques universitaires et les prestataires de DPC afin de refonder les activités de DPC selon la dynamique post-pandémie, sur la base des besoins des bibliothécaires universitaires, avec des offres alignées sur les défis et les tendances des bibliothèques universitaires contemporaines, mieux adaptées à l’évolution du contexte de l’enseignement en Thaïlande.

**Effect of humble leadership on knowledge sharing, change and ethnicity in Iranian public libraries**

**Effet de l’humilité du leadership sur le partage de connaissances, le changement et l’ethnique dans les bibliothèques publiques iraniennes**

*Mahshid Eltemasi, Samira Arami*

*IFLA Journal, 50-2, 394-407*

**Résumé:**

Cette étude examine l’influence d’un leadership humble sur le partage des connaissances et l’adaptabilité dans les bibliothèques publiques iraniennes tout en mettant l’accent sur la diversité ethnique. Au moyen d’une approche quantitative et d’études corrélationnelles, l’étude s’est penchée sur le personnel des bibliothèques publiques issu de diverses origines ethniques en Iran, sur la base d’un échantillonnage groupé aléatoire. Les résultats indiquent qu’un leadership humble affecte positivement tant la volonté d’adaptation que le partage de connaissances parmi le personnel de la bibliothèque. En outre, une analyse basée sur le test de Kruskal–Wallis a révélé que l’un des aspects de l’humilité du leadership (« Reconnaissance des limites personnelles ») n’avait qu’un faible lien avec l’ethnité. Il est intéressant de noter que les ethnicités arabes iraniennes ont exprimé moins de préférence quant à l’humilité du leadership, tandis que le partage des connaissances et l’adaptabilité augmentaient chez les employés de toutes les origines ethniques. Cette étude innove en enquêtant simultanément sur diverses variables, y compris l’ethnité, en lien avec l’humilité du leadership. Les résultats ont des implications considérables pour la gestion des bibliothèques publiques, soulignant l’importance d’une communication efficace et de l’empathie dans la réduction de la résistance des employés au partage des connaissances et au changement organisationnel.

**Musical score representation and retrieval in digital environments**

**Représentation et récupération de partitions de musique dans les environnements numériques**

*Jessica Beatriz Tolare, Mariângela Spotti Lopes Fujita, Fabiano Ferreira de Castro*

*IFLA Journal, 50-2, 408-415*

**Résumé:**

Cet article vise à analyser la représentation et la récupération de partitions musicales soumises à des cybercitoyens ou à des institutions, dépôts et bibliothèques numériques dans différents environnements numériques comme des sites de stockage de partitions. Il se penche sur les caractéristiques de ces interfaces et il examine la manière dont les partitions sont présentées thématiquement. La méthode employée dans cette étude était une recherche préliminaire afin de chercher et de récupérer des partitions et une recherche descriptive afin d’analyser la représentation thématique au sein de ces environnements. Les résultats révèlent que ces sites sont organisés par catégorie, ce qui aide les cybercitoyens dans leur recherche de partitions musicales. Les sites analysés diffèrent en termes de compréhension et d’organisation mais ils offrent des fonctions similaires concernant l’indexation. Par conséquent, l’étude se prononce en faveur de l’investissement dans leur structure, leur organisation, leurs langues et leurs systèmes, ainsi que dans la formation professionnelle.

**Understanding the US Library Diplomacy Practices in the 21st Century**

**Die Praktiken der US-Bibliotheksdiplomatie im 21. Jahrhundert verstehen**

*Randolf Mariano*

*IFLA Journal, 50-2, 211-227*
Zusammenfassung:

AI-Generated Content Tools and Students’ Critical Thinking: Insights from a Chinese University

KI-generierte Inhalte und das kritische Denken der Studierenden: Einblicke aus einer chinesischen Universität

Xiaozhu Zou, Ping Su, Lexing Li, Ping Fu

IFLA Journal, 50-2, 228-241

Zusammenfassung:

Librarians’ role in the preservation and dissemination of indigenous knowledge

Die Rolle von Bibliothekar*innen bei der Bewahrung und Verbreitung von indigem Wissen

Joseline Chigwada, Patrick Ngulube

IFLA Journal, 50-2, 242-256

Zusammenfassung:
**Professional qualifications, accreditation, and certification in LIS schools: a global perspective**

Berufliche Qualifikationen, Akkreditierung und Zertifizierung in LIS-Schulen: eine globale Perspektive

Fatih Oguz, Chris Cunningham, Nuria Bautista-Puig, Tiago Emmanuel Nunes Braga

IFLA Journal, 50-2, 257-272

**Zusammenfassung:**


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**The impact of multimedia in academic information literacy instruction in libraries**

Die Bedeutung von Multimedia für die Vermittlung von Informationskompetenz in wissenschaftlichen Bibliotheken

Hozefa Ramgadwala

IFLA Journal, 50-2, 273-291

**Zusammenfassung:**


**Knowledge management for climate change in South Africa: A proposed strategy**

Wissensmanagement für den Klimawandel in Südafrika: ein Strategievorschlag

Prof. Madeleine C. Fombad

IFLA Journal, 50-2, 292-309

**Zusammenfassung:**


**Exploring the research domains and gender gap in LIS doctoral research**

**Untersuchung der Forschungsbereiche und der geschlechtsspezifischen Unterschiede in der LIS-Doktorandenforschung**

*Mallikarjun Dora, Kanagasabai K, Lavji N Zala, Raj Kishor Kampa*

*IFLA Journal, 50-2, 310-321*

**Zusammenfassung:**


**When a disaster strikes: Are libraries in the Philippines ready?**

**Wenn die Katastrophe kommt: Sind die Bibliotheken auf den Philippinen darauf vorbereitet?**

*Daryl Lustracion Superio, Joseph Marmol Yap, Jufel Ma. Lourdes Sebial-Guinanao, Railingel Calliling*

*IFLA Journal, 50-2, 322-340*

**Zusammenfassung:**

Bibliotheken gegenüber potenziellen Katastrophen zu stärken.

**Research data management in selected East African libraries: A survey**

Forschungsdatenmanagement in ausgewählten ostafrikanischen Bibliotheken: ein Überblick

Subaveerapandiyan A, Jeremiah Emeka Ugwulebo
IFLA Journal, 50-2, 341-353

Zusammenfassung:


**Information competency assessment of undergraduates: A Pakistani perspective**

Bewertung der Informationskompetenz von Studierenden: eine pakistanische Perspektive

Naha Irfan, Muhammad Rafiq, Muhammad Arif
IFLA Journal, 50-2, 354-364

Zusammenfassung:


**Redefining academic library work: Telecommuting potential in post-COVID Ghana**

Die Arbeit in wissenschaftlichen Bibliotheken neu definieren: Home-Office-Potenzial im Post-COVID-Ghana

Wilhemina Odarkor Ofori
IFLA Journal, 50-2, 365-376

Zusammenfassung:

Traditionell waren Bibliothekarinnen und Bibliothekare auf eine physische Einrichtung beschränkt, entweder weil ihre Rolle eine persönliche Interaktion erforderte oder weil sie ihre Arbeitsmaterialien in dem Gebäude untergebracht hatten. Da die Arbeit von Bibliotheken und Bibliothekar*innen immer mobiler wird, kann ein Großteil der Arbeit bequem von einem Laptop aus an jedem beliebigen Ort erledigt werden. Diese Studie untersuchte die Ansichten von akademischen Bibliothekar*innen in Ghana über Telearbeit und ihre Durchführbarkeit in der ghanaischen Landschaft. Es wurde ein exploratives Fallstudiedesign verwendet, um mit Hilfe eines Fragebogens eine Stichprobe von insgesamt 57 Befragten zu bilden. Die Ergebnisse zeigen, dass die akademischen Bibliothekarinnen und
Bibliothekare die Telearbeit befürworten und bereit sind, mindestens einmal pro Woche Telearbeit zu leisten. Hinzu kam der Vorteil flexibler Arbeitszeiten und geringerer Reisezeiten. Eine große Herausforderung, mit der man gerechnet hatte, war der Widerstand der Unternehmensleitung gegen die formelle Einführung der Telearbeit.

The current state of continuing professional development (CPD) of academic librarians, and the roles of CPD providers in Thailand

Der aktuelle Stand der beruflichen Weiterbildung (CPD) von akademischen Bibliothekar*innen und die Rolle der CPD-Anbieter in Thailand

Chutima Sacchanand, Nilobon Wimolsittichai, Orapan Kankonsue, Wararak Pattanakiatpong

IFLA Journal, 50-2, 377-393

Zusammenfassung:

Effect of humble leadership on knowledge sharing, change and ethnicity in Iranian public libraries

Auswirkung von Humble Leadership auf Wissensaustausch, Wandel und Ethnizität in öffentlichen Bibliotheken im Iran

Mahshid Eltemasi, Samira Arami

IFLA Journal, 50-2, 394-407

Zusammenfassung:

Musical score representation and retrieval in digital environments

Darstellung und Abruf von Musiknoten in digitalen Umgebungen

Jessica Beatriz Beatriz Tolare, Mariângela Spotti Lopes Fujita, Fabiano Ferreira de Castro

IFLA Journal, 50-2, 408-415
Zusammenfassung:
Dieser Artikel zielt darauf ab, die Darstellung und den Abruf von Musikpartituren zu analysieren, die von Internetnutzern oder Institutionen, Repositorien und digitalen Bibliotheken in verschiedenen digitalen Umgebungen, wie z. B. Notenspeichern, übermittelt wurden. Er betrachtet die Merkmale dieser Schnittstellen und beobachtet, wie die Noten thematisch dargestellt werden. Die in dieser Studie angewandte Methode war eine explorative Forschung zur Suche und zum Abruf von Bewertungen und eine deskriptive Forschung zur Analyse der thematischen Darstellung innerhalb dieser Umgebungen. Die Ergebnisse zeigen, dass diese Websites nach Kategorien geordnet sind, was den Internetnutzern bei der Suche nach Musiknoten hilft. Die untersuchten Websites unterscheiden sich in Bezug auf ihren Umfang und ihre Organisation, weisen jedoch ähnliche Merkmale in Bezug auf die Indexierung auf. Daher plädiert die Studie für Investitionen in ihre Struktur, Organisation, Sprachen und Systeme sowie in die Berufsausbildung.

**Understanding the US Library Diplomacy Practices in the 21st Century**

Понимание практики библиотечной дипломатии США в XXI веке

Randolf Mariano

Рэндолф Мариано

Журнал ИФЛА, 50-2, 211-227

Аннотация:
В данной исследовательской тематической работе изучаются взгляды и точки зрения 17 библиотечных экспертов США, вовлеченных в практику библиотечной дипломатии 21 века. Путем использования шаблонного анализа автор выделяет четыре основные темы библиотечной дипломатии: (1) участники продемонстрировали скрытые и явные роли в дипломатическом участии; (2) основная цель библиотечной дипломатии заключалась в содействии диалогу знаний; (3) стратегии были направлены на воспитание культурного смирения; и (4) участники рассматривали цифровизацию как важный инструмент в международном библиотечном деле. Данное исследование дает значительное представление о менее изученной теме библиотечной дипломатии, в особенности когда библиотеки 21-го века сталкиваются с глобальными проблемами, связанными со свободой информации; ценностью равенства, разнообразия, инклюзивности и доступности; а также усилиями по устойчивому развитию.

Библиотечная дипломатия как никогда важна для того, чтобы быть на переднем крае налаживания диалога по всему миру. Исследование поощряет дальнейшее изучение практики библиотечной дипломатии в разнообразных географических и международных контекстах.

**AI-Generated Content Tools and Students’ Critical Thinking: Insights from a Chinese University**

Инструменты создания контента, генерируемые искусственным интеллектом, и критическое мышление студентов: идеи китайского университета

Xiaozhu Zou, Ping Su, Lexing Li, Ping Fu

Сяочжу Цзоу, Пин Су, Лексинг Ли, Пин Фу

Журнал ИФЛА, 50-2, 228-241

Аннотация:
В данном исследовании уделяется внимание влиянию инструментов контента, генерируемых искусственным интеллектом, на навыки критического мышления учащихся и их отношение к подобным инструментам. Был проведен опрос 851 студента китайского университета с целью изучения моделей использования ими контента, их мотивации, предполагаемых преимуществ и осведомленности о рисках, а также важности навыков критического мышления. В этом исследовании также проводится анализ того, как библиотеки и библиотекари могут помочь студентам развить навыки критического мышления. Результаты показывают, что студенты мужского пола и небинарные студенты чаще использовали инструменты искусственного интеллекта, что указывает на пробел в их научной работе. Исследование раскрывает такие мотивы, как экономия времени и усилий. Оно также демонстрирует осведомленность учащихся о рисках и ограничениях, подчеркивая необходимость навыков критического мышления при использовании инструментов контента, генерируемых искусственным интеллектом. Эти результаты имеют важное значение для академических библиотек, поскольку студенты выразили желание получить образование и опыт работы в области искусственного интеллекта и критического мышления. Библиотеки имеют возможность предоставлять ресурсы, организовывать семинары и давать рекомендации, которые призваны расширить возможности студентов в области осознанного и критического мышления.
Librarians’ role in the preservation and dissemination of indigenous knowledge

Роль библиотекарей в сохранении и распространении знаний коренных народов

Josilene Chigwada, Patrick Ngulube

Жосилен Чигвада, Патрик Нгулубе

Журнал ИФЛА, 50-2, 242-256

Аннотация:

В эпоху цифровых инноваций сохранение знаний коренных народов находится на пересечении наследия и технологий. Библиотекарей играет решающую роль в преодолении сложностей технологий, соблюдая при этом протоколы культуры. Благодаря всестороннему изучению библиотечной практики авторы данного исследования стремились раскрыть, как местные знания могут быть этически сохранены в цифровом пространстве. При участии целенаправленно выбранных 20 библиотекарей Зимбабве было проведено качественное исследование. Интервью и наблюдения использовались для сбора данных, которые анализировались с помощью тематического контент-анализа. Результаты показывают, что в библиотеках сохранялись знания коренных народов в форме поэзии, фольклора, драмы и артефактов; были продемонстрированы традиционные танцы; иногда производилась запись живых выступлений и специальных сборников. Основными сложностями, с которыми пришлось столкнуться, были проблемы этнического характера, связанные с документированием знаний коренных народов. Библиотекарям рекомендуется активно сотрудничать с общинами коренных народов в ходе осуществления проектов, касающихся их знаний, с целью избежания противодействий со стороны носителей этих знаний.

Professional qualifications, accreditation, and certification in LIS schools: a global perspective

Профессиональная квалификация, аккредитация и сертификация в школах LIS: глобальная перспектива

Fatih Oguz, Chris Cunningham, Nuria Bautista-Puig, Tiago Emmanuel Nunes Braga

Фатих Огуз, Крис Каннингэм, Нурия Баутиста-Пуг, Тьяго Эммануэль Нунес Брага

Журнал ИФЛА, 50-2, 257-272

Аннотация:

Учебные заведения библиотечного дела и информационных наук, а также их аккредитация играют решающую роль в подготовке индивидуальных соискателей к тому, чтобы стать эффективными и компетентными профессионалами в области библиотек и информации. Был принят ряд усилий для анализа стандартов и процедур аккредитации специалистов в области библиотек и информатики в конкретном контексте (например, в стране). Однако исследования с глобальной точки зрения ограничены. В этой статье представлен обзор квалификации специалистов в области библиотек и информатики, а также их аккредитации и сертификации в учебных заведениях библиотечного дела и информационных технологий по всему миру. Для сбора всей этой информации была использована стратегия невероятной выборки. Всего было представлено 586 программ (например, бакалавриата) из 198 библиотечных и информационных школ в 69 странах. Результаты показывают, что аккредитованная национальная степень была наиболее необходимым документом для работы профессиональным библиотекарем в этой области. Программы магистратуры оказались наиболее часто предлагаемыми программами на получение степени в этих учебных заведениях, причем английский стал самым популярным языком обучения во всех программах на получение степени.

The impact of multimedia in academic information literacy instruction in libraries

Влияние мультимедиа на обучение академической информационной грамотности в библиотеках

Hozefa Ramgadwala

Хозефа Рамгадвала

Журнал ИФЛА, 50-2, 273-291

Аннотация:

Целью данного исследования является понимание влияния мультимедиа на академическую информационную грамотность (AIL). В статье рассматривается, как бум информационных технологий, а также технологий в области коммуникации технологий (ICT) влияет на предпочтения и педагогику AIL. В статье также обсуждаются текущие и будущие тенденции влияния мультимедиа на дидактический процесс обучения. Опрос студентов высших учебных заведений (HE) в трех
Knowledge management for climate change in South Africa: A proposed strategy

Madeleine C Fombad Prof

Жurnal ИFLА, 50-2, 292-309

Anнотация:
В данной статье исследуется менеджмент знаний относительно изменения климата в Южной Африке. Автор провел систематический поиск литературы и контент-анализ соответствующих учебников, статей, политических стратегий, структур и законодательства по управлению знаниями и изменению климата. Изменение климата, управление знаниями и стратегии были ключевыми словами, в соответствии с запросами в базах данных Scopus, ProQuest, EBSCO, Science Direct, Emerald, Elsevier, Taylor and Francisco, Springer, Wiley и Inderscience, с целью обеспечения всестороннего охвата. Извлеченные статьи рассматривались на предмет соответствия требованиям. После удаления 2900 нерелевантных дублирующих записей, которые не полностью соответствовали объему исследования, был завершен описательный синтез 100 соответствующих статей. В результате возникла стратегия управления знаниями в области изменения климата, предусматривающая создание Центра управления знаниями в области климата.

Exploring the research domains and gender gap in LIS doctoral research

Малликарджун Дора, Канагасабай К, Лавжи Н Зала, Радж Кишор Кампа

Жurnal ИFLА, 50-2, 310-321

Anнотация:
Целью данной работы является анализ областей исследований и гендерного разрыва в докторских исследованиях LIS. Автор провел систематический поиск литературы и контент-анализ соответствующих баз данных Scopus, ProQuest, EBSCO, Science Direct, Emerald, Elsevier, Taylor and Francisco, Springer, Wiley и Inderscience, с целью обеспечения всестороннего охвата. Извлеченные статьи рассматривались на предмет соответствия требованиям. После удаления 2900 нерелевантных дублирующих записей, которые не полностью соответствовали объему исследования, был завершен описательный синтез 100 соответствующих статей. В результате возникла стратегия управления знаниями в области изменения климата, предусматривающая создание Центра управления знаниями в области климата.
When a disaster strikes: Are libraries in the Philippines ready?

Daryl Lustracion Superio, Joseph Marmol Yap, Jufel Ma. Lourdes Sebial-Guinanao, Roilingel Calilung

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When a disaster strikes: Are libraries in the Philippines ready?
Redefining academic library work: Telecommuting potential in post-COVID

Ghana

Wilhemina Odarkor Ofori

Журнал ИФЛА, 50-2, 365-376

Аннотация:

Традиционно библиотекари были ограничены физическим помещением либо потому, что их роль требовала личного взаимодействия, либо потому, что их рабочие материалы размещались в здании. Поскольку работа библиотек и библиотекарей становится все более мобильной, большую часть работы удобно выполнять с ноутбука в любом месте. В данном исследовании оценивались точки зрения академических библиотекарей в Гане на удаленную работу и ее целесообразность в условиях Ганы. В нем использовался исследовательский дизайн тематического исследования для выборки в общей сложности 57 респондентов путем заполнения анкеты. Результаты показывают, что академические библиотекарии выступали за удаленную работу и были готовы работать удаленно по крайней мере раз в неделю. Кроме того, было уважено преимущество гибкого графика работы и сокращено время в пути. Основной проблемой, с которой, как оказалось, придется столкнуться, станет сопротивление руководства официальному внедрению дистанционной работы.

The current state of continuing professional development (CPD) of academic librarians, and the roles of CPD providers in Thailand

Chutima Sacchanand, Nilobon Wimolsittichai, Orapan Kankonsue, Wararak Pattanakitpong

Журнал ИФЛА, 50-2, 377-393

Аннотация:

В данной работе проводилось исследование текущего состояния непрерывного профессионального развития (CPD) тайских академических библиотекарей и роли CPD в обеспечении CPD в Таиланде. Была использована онлайн-анкета 243 тайских академических библиотекарей, а также глубокие интервью с 20 директорами библиотек и заместителями директоров. Количественные данные были проанализированы с помощью описательного анализа, в то время как качественные данные были изучены с помощью тематического анализа. Исследование показало, что академические библиотекарии осознают важность участия в мероприятиях CPD и отдают предпочтение онлайн-CPD, при этом значительную роль играют “внутренние” провайдеры и сети академических библиотек. В исследовании рекомендуется сосредоточиться на навыках в области информационных технологий и владении английским языком. Исследование также демонстрирует необходимость в кратком и динамичном руководстве CPD, чтобы приспособить деятельность CPD к динамике после пандемии, основываясь на потребностях академических библиотек, что академические библиотеки выступали за удаленную работу и были готовы работать удаленно по крайней мере раз в неделю. Кроме того, было уважено преимущество гибкого графика работы и сокращено время в пути. Основной проблемой, с которой, как оказалось, придется столкнуться, станет сопротивление руководства официальному внедрению дистанционной работы.

Группа студентов библиотечных специальностей демонстрировала более высокий уровень информационной компетентности, чем студенты других дисциплин. Группа студентов, занимающихся общественными науками, сообщила, что чувствует себя менее компетентной в области информации по сравнению с остальными пятью группами. В исследовании рассматривается пробел в литературе и предлагаются важнейшие меры для академиков и библиотечных практиков по созданию эффективных программ цифровой и информационной грамотности для студентов университетов.
Effect of humble leadership on knowledge sharing, change and ethnicity in Iranian public libraries

Махшид Элтемаси, Самира Арами

Journal IFLA, 50-2, 394-407

Abstract:

The aim of this study was to analyze the influence of humble leadership on knowledge sharing and change, with an emphasis on ethnic diversity in Iranian public libraries. Using a quantitative approach and correlation methods, the authors surveyed library employees from different ethnic groups in Iran, using a random cluster sample. The results show that humble leadership had a positive impact on adaptability and knowledge sharing between library staff. Moreover, the analysis using the Kruskal–Wallis test showed that one aspect of humble leadership – "Recognition of personal limitations" – had only a negligible connection with ethnic identity. Interestingly, representatives of the Iranian Arab nationality were less inclined to support humble leadership, but knowledge sharing and adaptability improved among staff of all ethnic groups.

Understanding the US Library Diplomacy Practices in the 21st Century

(Análisis de las prácticas de diplomacia bibliotecaria en Estados Unidos en el siglo XXI)

Randolf Mariano

IFLA Journal, 50-2, 211-227

Resumen:

Este estudio de caso exploratorio analiza las opiniones y perspectivas de 17 expertos en bibliotecas estadounidenses relacionadas con las prácticas de diplomacia bibliotecaria en el siglo XXI. A partir de un análisis de plantillas, se identificaron cuatro temas principales en materia de diplomacia bibliotecaria: (1) los actores demostraron tener roles implícitos y explícitos en la diplomacia bibliotecaria; (2) el objetivo principal de la diplomacia bibliotecaria fue facilitar el intercambio de conocimiento; (3) el propósito de las estrategias fue promover la humildad cultural; y (4) los actores consideraron la digitalización como un instrumento importante para el trabajo bibliotecario internacional. Esta investigación ofrece perspectivas significativas sobre el tema poco analizado de la diplomacia bibliotecaria, teniendo en cuenta que las bibliotecas del siglo XXI se enfrentan a desafíos globales relacionados con la libertad de
información; los valores de equidad, diversidad, inclusión y accesibilidad; y los esfuerzos en materia de sostenibilidad. Hoy más que nunca es fundamental que la diplomacia bibliotecaria esté a la vanguardia del diálogo en todo el mundo. El estudio promueve una investigación más exhaustiva de las prácticas de diplomacia bibliotecaria en diversos contextos geográficos e internacionales.

**AI-Generated Content Tools and Students’ Critical Thinking: Insights from a Chinese University**

(Herramientas de contenido generado por inteligencia artificial (IA) y pensamiento crítico de los estudiantes: perspectivas de una universidad china)

Xiaozhu Zou, Ping Su, Lexing Li, Ping Fu

*IFLA Journal*, 50-2, 228-241

**Resumen:**

Este estudio analiza el impacto de las herramientas de contenido generado por inteligencia artificial en las habilidades de pensamiento crítico de los estudiantes y sus actitudes con respecto a estas herramientas. Se realizó una encuesta a 851 estudiantes de una universidad china para analizar sus patrones de uso, motivaciones, percepción de beneficios y conciencia de riesgos, y la importancia de las habilidades de pensamiento crítico. El estudio también analiza cómo las bibliotecas y los bibliotecarios pueden ayudar a los estudiantes a desarrollar sus habilidades de pensamiento crítico. Los resultados indican que los estudiantes de sexo masculino y los estudiantes no binarios utilizan con más frecuencia las herramientas de inteligencia artificial, lo que evidencia una brecha en la investigación. Además, el estudio pone de manifiesto motivaciones como el ahorro de tiempo y esfuerzo. También demuestra que los estudiantes son conscientes de los riesgos y las limitaciones, y destaca la necesidad de habilidades de pensamiento crítico para navegar por las herramientas de contenido generado por inteligencia artificial. Estos resultados son de gran importancia para las bibliotecas académicas, ya que los estudiantes expresaron su deseo de recibir educación y capacitación en materia de inteligencia artificial y pensamiento crítico. Las bibliotecas pueden ofrecer recursos, talleres y orientación para fortalecer la formación de los estudiantes en prácticas de pensamiento crítico e informado.

**Professional qualifications, accreditation, and certification in LIS schools: a global perspective**

(Formación profesional, acreditaciones y certificaciones en las instituciones académicas dedicadas a la bibliotecología y las ciencias de la información: una perspectiva mundial)

Fatih Oguz, Chris Cunningham, Nuria Bautista-Puig, Tiago Emmanuel Nunes Braga

*IFLA Journal*, 50-2, 257-272
Las instituciones académicas dedicadas a la bibliotecología y las ciencias de la información y sus certificaciones tienen un rol fundamental en la formación de profesionales en bibliotecología y ciencias de la información eficaces y competentes. Se han realizado varios esfuerzos para analizar las normas y procedimientos de certificación de profesionales de la bibliotecología y las ciencias de la información en un contexto específico (por ejemplo, un país). Sin embargo, la investigación desde una perspectiva global es limitada. Este artículo ofrece información general sobre la formación de los profesionales de la bibliotecología y las ciencias de la información de todo el mundo. Para recopilar esta información se empleó una estrategia de muestreo no probabilístico. Participaron 586 programas (por ejemplo, de grado) de 198 instituciones académicas dedicadas a la bibliotecología y las ciencias de la información de 69 países. Los resultados indicaron que un título nacional homologado fue la certificación más requerida para trabajar como bibliotecario profesional. Los programas de maestría fueron los que se ofrecieron con mayor frecuencia en estas instituciones académicas, y el inglés fue el idioma de enseñanza más utilizado en todos los programas.

**The impact of multimedia in academic information literacy instruction in libraries**

(El impacto de la tecnología multimedia en la alfabetización informacional académica de las bibliotecas)

Hozefa Ramgadwala

IFLA Journal, 50-2, 273-291

El objetivo de este estudio es comprender el impacto de la tecnología multimedia en la alfabetización informacional académica en el ámbito de la enseñanza superior. El documento analiza cómo el auge de las tecnologías de la información y la comunicación (TIC) influye en la preferencia y la pedagogía de la alfabetización informacional académica. También analiza las tendencias actuales y futuras de la influencia de la tecnología multimedia en la formación pedagógica. Se realizó una encuesta entre estudiantes del ámbito de la enseñanza superior de tres países, Reino Unido, Kenia e India, para comprender el cambio hacia la tecnología multimedia en las bibliotecas. El objetivo fue determinar si los atributos de la conducta, la naturaleza académica o artística (verbalizadores/visualizadores) y la ubicación geográfica de la universidad influyen en el aprendizaje multimedia. Los resultados del estudio no respaldaron la interacción aptitud-tratamiento (teoría ATI). En el contexto actual, podría decirse que los diferentes estudiantes de naturaleza académica o artística necesitan diferentes tipos de enseñanza para optimizar su aprendizaje, pero la encuesta indicó que la naturaleza de los estudiantes no influye en su elección del método de enseñanza (enseñanza verbal/visual). También indicó que la ubicación de la universidad facilita o dificulta la capacidad de aprendizaje de los estudiantes.

**Knowledge management for climate change in South Africa: A proposed strategy**

(Gestión del conocimiento para el cambio climático en Sudáfrica: estrategia propuesta)

Madeleine C Fombad Prof

IFLA Journal, 50-2, 292-309

Este artículo investiga la gestión del conocimiento para el cambio climático en Sudáfrica y propone una estrategia de gestión del conocimiento para el cambio climático. Es probable que los aspectos económicos, políticos, sociales y ecológicos del cambio climático planteen una amenaza para el Plan Nacional de Desarrollo y el desarrollo sostenible del país. Debido al creciente énfasis en la gestión del conocimiento para el desarrollo sostenible y la importancia del conocimiento para la capacidad de adaptación y mitigación del cambio climático, la gestión del conocimiento ha sido una estrategia esencial de respuesta al cambio climático por parte de diversos organismos gubernamentales y no gubernamentales de todo el mundo. Los efectos del cambio climático y la falta de atención a la gestión del conocimiento para el cambio climático hacen que éste sea un importante tema de investigación. Se realizó una búsqueda bibliográfica sistemática y un análisis de contenido de libros de texto, artículos, estrategias políticas, marcos y leyes pertinentes en materia de gestión del conocimiento y cambio climático. Cambio climático, gestión del conocimiento y estrategias fueron las palabras clave que
se consultaron en las bases de datos Scopus, ProQuest, EBSCO, Science Direct, Emerald, Elsevier, Taylor and Francis, Springer, Wiley e Inderscience para garantizar una cobertura amplia. Los artículos recuperados fueron evaluados para determinar su relevancia. Luego de eliminar 2900 entradas duplicadas irrelevantes que no abordaban por completo el alcance del estudio, se realizó una síntesis descriptiva de los 100 artículos pertinentes. Se propuso una estrategia de gestión del conocimiento para el cambio climático que recomienda la creación de un Centro de Gestión del Conocimiento para el Clima.

**Exploring the research domains and gender gap in LIS doctoral research**

*(Analisis de dominiós de investigación y brechas de género en la investigación doctoral en bibliotecología y ciencias de la información)*

Mallikarjun Dora, Kanagasabai K, Lavji N Zala, Raj Kishor Kampa

**IFLA Journal, 50-2, 310-321**

*Resumen:*

Este estudio tiene como objetivo analizar los dominios de investigación, la brecha de género y las perspectivas del mercado laboral de la investigación doctoral en bibliotecología y ciencias de la información en India. Se utilizó Sodhganga, un repositorio digital de tesis y disertaciones indias, para extraer información sobre tesis doctorales, y el sistema de clasificación Jarvelin & Vakkari para categorizar los temas de investigación doctoral. Se analizaron un total de 808 tesis doctorales aprobadas entre 2016 y 2020 utilizando IBM SPSS y Tableau. De acuerdo con los resultados del estudio, la investigación doctoral en bibliotecología y ciencias de la información está creciendo y cada año se otorgan 150 doctorados en bibliotecología y ciencias de la información. La búsqueda de información (33,8%), las actividades de los servicios bibliotecarios y de información (30,7%) y la comunicación científica y profesional (16,5%) fueron los temas de investigación preferidos por los estudiantes de doctorado durante el periodo de estudio. Además, se observa que existe una brecha de género en el número de doctorados otorgados, siendo más varones que mujeres los que reciben estos títulos. Los profesionales de la bibliotecología y las ciencias de la información con un doctorado tienen el índice de empleo más alto (96,2%) y la mayoría trabaja en la administración pública.

**When a disaster strikes: Are libraries in the Philippines ready?**

*(Si ocurre una catástrofe, ¿las bibliotecas de Filipinas están preparadas?)*

Daryl Lustracion Superio, Joseph Marmol Yap, Jufel Ma. Lourdes Sebial-Guinanao, Roilingel Caliling

**IFLA Journal, 50-2, 322-340**

*Resumen:*

Las catástrofes, ya sea provocadas por la naturaleza o por conductas humanas, representan una amenaza para las bibliotecas de Filipinas. Utilizando un método mixto de investigación, esta investigación incluyó una encuesta detallada de siete partes que fue completada por 90 directores y responsables de bibliotecas de todo el país. Los resultados indicaron que muchas bibliotecas sufrieron catástrofes durante la última década. No obstante, muchas de ellas no contaban con la preparación adecuada, y 69 bibliotecas funcionaban sin un plan de gestión de catástrofes. Esta falta de preparación es consecuencia de limitaciones tales como la falta de financiamiento y de recursos humanos, entre otras, y de la percepción de un bajo riesgo de que ocurran estas catástrofes. Si bien la mayoría de las bibliotecas han implementado protocolos básicos de emergencia, tales como sistemas de alarma y kits de emergencia, y algunas cuentan con seguros y teléfonos de emergencia actualizados, estas medidas no alcanzan para cumplir con los requisitos generales que demanda una gestión de catástrofes efectiva. El estudio destaca la importancia de contar con planes de gestión de catástrofes, equipos adecuados, estructuras y redes bibliotecarias sólidas para la preparación y gestión de las catástrofes. Asimismo, insta a tomar acciones urgentes en lo que respecta a la implementación de políticas, el desarrollo de capacidades y la profundización de las investigaciones para mejorar la resiliencia de las bibliotecas en caso de catástrofes.

**Research data management in selected East African libraries: A survey**

*(Informe sobre la gestión de datos de investigación en bibliotecas seleccionadas de África del Este: encuesta)*

Subaveerapandiyan A, Jeremiah Emeka Ugwulebo

**IFLA Journal, 50-2, 341-353**
Resumen:
Este estudio investiga el conocimiento respecto de la gestión de datos de investigación (GDI) y servicios entre los profesionales de bibliotecas seleccionadas de África del Este. Se utilizó un diseño de investigación a partir de una encuesta y se recopilaron datos a través de un cuestionario estructurado que fue completado por 180 participantes en representación de cuatro países de África del Este: Malawi, Mozambique, Zambia, y Zimbabue. Los resultados revelaron que solo 31,1% de los bibliotecarios seleccionados de África del Este manifestaron que sus instituciones bibliotecarias ofrecían servicios de GDI. Los servicios estándar de GDI ofrecidos por sus bibliotecas incluían la publicación, el intercambio y la reutilización de datos, y se identificó la colaboración con programas académicos como un enfoque esencial para el desarrollo de habilidades de GDI. El estudio destaca que es necesario que los bibliotecarios adquieran habilidades jurídicas, políticas y de asesoramiento, conocimientos sobre recursos institucionales y extra institucionales, y sobre procedimientos de investigación para suministrar servicios de GDI de una manera efectiva.

Information competency assessment of undergraduates: A Pakistani perspective
(Evaluación de las competencias informacionales de los estudiantes de grado: una perspectiva pakistaní)

Naha Irfan, Muhammad Rafiq, Muhammad Arif
IFLA Journal, 50-2, 354-364

Resumen:
Los estudiantes que cuentan con habilidades informacionales están mejor preparados para utilizar las grandes cantidades de datos disponibles y para tener un pensamiento crítico y creativo. Este estudio busca abordar la brecha de investigación en la educación superior de Pakistán a través de la evaluación de las habilidades informacionales de los estudiantes de grado en universidades de primer nivel. Se llevó a cabo una encuesta transversal en la que participaron 669 estudiantes de grado, y se utilizaron estadísticas inferenciales y descriptivas para sacar conclusiones al respecto. El estudio determinó que los estudiantes consideraban que sus habilidades informacionales eran ligeramente superiores al promedio, y no existían diferencias significativas en función del género o el año lectivo. El campo de estudio tenía una incidencia significativa en el nivel de competencia informacional del estudiante: los estudiantes de ingeniería alcanzaban niveles más altos que los estudiantes de otras disciplinas. Los estudiantes del área de las ciencias sociales expresaron que se sentían menos competentes en este tema en comparación con los otros cinco grupos. El estudio aborda la falta de bibliografía al respecto y propone medidas esenciales dirigidas a academicistas y profesionales bibliotecarios para crear programas efectivos de alfabetización informacional y digital para estudiantes universitarios.

Redefining academic library work: Telecommuting potential in post-COVID Ghana
(Redefinir el trabajo en las bibliotecas académicas: el potencial del trabajo remoto en Ghana pos-COVID)

Wilhemina Odarkor Ofori
IFLA Journal, 50-2, 365-376

Resumen:
Tradicionalmente, los bibliotecarios estaban limitados a espacios físicos ya sea porque sus funciones exigían una interacción presencial o porque su trabajo requería la manipulación de material almacenado en las instalaciones. Dado que el trabajo de las bibliotecas y los bibliotecarios se ha vuelto cada vez más remoto, muchas tareas se pueden realizar fácilmente con una computadora portátil desde cualquier lugar. Este estudio evaluó los puntos de vista de los bibliotecarios de bibliotecas académicas en Ghana sobre el trabajo remoto y su viabilidad en el sector bibliotecario de dicho país. Se utilizó un diseño de estudio de caso exploratorio para muestrear a 57 participantes a través de un cuestionario. Los resultados determinaron que los bibliotecarios de bibliotecas académicas estaban a favor del trabajo remoto y que deseaban emplearlo al menos un día a la semana. Además, esta modalidad brinda el beneficio de la flexibilidad del horario laboral y la reducción del tiempo de traslado. El mayor desafío que se esperaba encontrar con respecto a este tema era la resistencia por parte de la gerencia de las bibliotecas a adoptar formalmente esta modalidad de trabajo.
The current state of continuing professional development (CPD) of academic librarians, and the roles of CPD providers in Thailand

(El estado actual del desarrollo profesional continuo (DPC) de los bibliotecarios de bibliotecas académicas y la función de los proveedores de DPC en Tailandia)

Chutima Sacchanand, Nilobon Wimolsittichai, Orapan Kankonsue, Wararak Pattanakiatpong

IFLA Journal, 50-2, 377-393

Resumen:

Esta investigación evalúa el estado actual del Desarrollo Profesional Continuo (DPC) de los bibliotecarios de bibliotecas académicas de Tailandia y la función de los proveedores de DPC, a través de métodos mixtos. Se utilizó un cuestionario en línea dirigido a 243 bibliotecarios de bibliotecas académicas de Tailandia y se realizaron entrevistas detalladas a 20 directores y subdirectores de bibliotecas. Los datos cuantitativos fueron analizados con un enfoque descriptivo mientras que los datos cualitativos fueron evaluados a través de un análisis temático. La investigación mostró que los bibliotecarios de bibliotecas académicas reconocieron la importancia de participar en las actividades de DPC y mostraron su preferencia por la modalidad en línea, especialmente con proveedores “internos” y redes de bibliotecas académicas. El estudio recomienda enfocarse en las habilidades de TI y el dominio del idioma inglés. Asimismo, demuestra la necesidad de una guía concisa y dinámica para que las bibliotecas académicas y los proveedores de DPC puedan rediseñar sus actividades en este escenario pos-pandemia en función de las necesidades de los bibliotecarios de bibliotecas académicas, alineando sus propuestas con los desafíos y tendencias académicas actuales que mejor se adaptan al nuevo contexto educativo tailandés.

Effect of humble leadership on knowledge sharing, change and ethnicity in Iranian public libraries

(El efecto de un liderazgo humilde en el intercambio de conocimientos, el cambio y la etnicidad en las bibliotecas públicas iraníes)

Mahshid Eltemasi, Samira Arami

IFLA Journal, 50-2, 394-407

Resumen:

Esta investigación examina la influencia que puede tener un liderazgo humilde en el intercambio de conocimientos y la adaptabilidad en bibliotecas públicas iraníes, haciendo hincapié en la diversidad étnica. A través de un enfoque cuantitativo y estudios relacionados, el estudio examinó al personal de las bibliotecas públicas de diferentes orígenes étnicos de Irán utilizando un muestreo aleatorio por conglomerados. Los resultados demostraron que tener un liderazgo humilde influyó positivamente en la predisposición del personal de la biblioteca para adaptarse y para compartir conocimientos. Además, un análisis realizado a partir de la prueba de Kruskal-Wallis reveló que un aspecto del liderazgo humilde —“Reconocimiento de las limitaciones personales”— tenía poca relación con la etnicidad. Curiosamente, los grupos étnicos árabes iraníes expresaron una menor preferencia por el liderazgo humilde aun cuando el intercambio de conocimientos y la adaptabilidad mejoraron entre los empleados de todos los orígenes étnicos. Esta investigación abre nuevos horizontes dado que investiga múltiples variables en simultáneo, incluida la etnicidad, relacionadas con el liderazgo humilde. Los resultados tienen consecuencias significativas para la gestión de bibliotecas públicas, destacando la importancia de una comunicación efectiva y de la empatía para reducir la resistencia del personal al intercambio de conocimientos y al cambio organizacional.

Musical score representation and retrieval in digital environments

(Representación y recuperación de partituras en entornos digitales)

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IFLA Journal, 50-2, 408-415

Resumen:

Este artículo busca analizar la representación y recuperación de partituras presentadas por internautas o instituciones, bibliotecas y repositorios digitales en varios entornos digitales tales como los sitios de almacenamiento de partituras. Considera las características de estas interfaces y señala cómo se representan las partituras temáticamente. El método utilizado en este estudio fue la investigación exploratoria para la búsqueda y recuperación de partituras y la investigación descriptiva.
para analizar la representación temática dentro de estos entornos. Los resultados señalan que estos sitios están organizados por categorías, lo que ayuda a los internautas en la búsqueda de partituras. Los sitios analizados difieren en su amplitud y organización, pero tienen rasgos similares en cuanto a la indización. En consecuencia, el estudio propone que se invierta en su estructura, organización, idiomas y sistemas, y en capacitación profesional.