

ID0024 – DECODING DIGITAL COMPETENCIES: A BIBLIOMETRIC ANALYSIS OF ACADEMIC LIBRARIANSHIP

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Abstract

As the digital revolution permeates academic librarianship, the salience of digital competencies has burgeoned. This bibliometric study embarks on an in-depth exploration of the sphere of digital competencies in academic librarianship from 2010 to 2023, with the purpose of understanding its evolutionary trajectory, unearthing emerging research pathways, and anticipating the progression of the field. Using a strict bibliometric analysis of 144 scholarly articles written during this time, the study gives a full picture of how pedagogical and digital skills work together to shape the future of this important field. It underscores the integral interrelationship amongst bibliometrics, scientometrics, and informetrics—tools that, despite their significance, receive scant acknowledgement in the realm of digital competencies for academic librarianship. This comprehensive analysis highlights the universal importance of digital competencies, underscoring significant contributions from both developed and developing nations while signaling the imperative for enhanced digital competencies, particularly in less developed regions. The study presents an array of digital competency themes, emphasizing the need for regular upskilling opportunities to keep pace with the dynamic nature of digital technologies, while underscoring the challenges posed by the ceaseless evolution of technology. It concludes with a call to action for the academic librarianship community to navigate this evolving paradigm with nuanced understanding, critical insight, and unwavering dedication, committing to continuous growth and innovation to secure their irreplaceable role in the digital age. Serving as a pioneering contribution, this study presents a wide-ranging analysis of the current trajectories and advancements in digital competencies for academic librarianship, delineating the pathway for subsequent academic investigations in this critical area of inquiry.

Keywords: *digital competencies; librarianship; bibliometric analysis; scientometrics and informetrics; evolution of library science, digital transformation.*

Introduction

The digital revolution has instigated a profound transformation across sectors, significantly impacting the sphere of academic librarianship (Schneider, 2016). Traditionally, academic libraries, regarded as repositories of physical resources primarily consisting of books, are currently evolving into dynamic digital information hubs due to increasing digitization.

Digital competencies, defined as a set of skills and knowledge that enable individuals to use digital technology effectively and responsibly (Ferrari, 2013), have become integral to this transformation. Further expanding on this, "decoding", in the present context, refers to the analytical process of understanding and interpreting the intrinsic qualities and implications of these "digital competencies" within academic librarianship (Fichman et al., 2014). The advent of digital databases, online catalogs, e-books, and the integration of sophisticated technologies such as artificial intelligence has necessitated a radical shift in academic libraries' service delivery and resource allocation (Dempsey, 2018).

The shift towards digital has triggered an evolution in the roles of academic librarians, necessitating their transition from traditional librarianship roles to becoming adept digital navigators equipped with these essential digital competencies (Hall, 2020). The explosive growth of digital resources, as evidenced by a 260% increase in e-book acquisitions in academic libraries between 2010 and 2019 (Association of Research Libraries, 2020), is reflective of the digital revolution's magnitude in the library sector. Moreover, academic librarians are now tasked with managing digital resources, curating online content, and assisting patrons in navigating digital databases, marking a significant departure from their conventional responsibilities (Albright, 2016).

The ascendance of bibliometric analysis within the myriad disciplines of Library and Information Science (LIS) encapsulates a tangible research dynamic. Envisaged by Pritchard (1969), bibliometric methodologies incorporate quantitative strategies, utilizing mathematical and statistical mechanisms to generate a holistic view of chosen subjects. This approach allows for meticulous collation and examination of bibliographic content, consequently condensing the extant literature into succinct overviews (Donthu et al., 2020). As articulated by Hota et al. (2019), bibliometric tools are capable of architecting an academic edifice for any body of scientific information, thereby facilitating systematic comparisons across geopolitical boundaries and institutions (Singh & Chander, 2014).

Given the voluminous nature of bibliographic content within LIS, the advent of bibliometric research methodology within this domain is hardly surprising (Broadus, 1987). Numerous investigations intertwining LIS and bibliometric analysis have surfaced, evolving it into a normative practice (Naseer & Mahmood, 2009). For instance, the scholarly contributions of Orero-Blat, Jordán, and Palacios-Marqués (2022) and Wang and Si (2023) underscore the imperativeness of delineating and quantifying digital skills and competencies, particularly in the contemporary, technocentric milieu.

Problem Statement

In the age of digitization, academic librarianship is undergoing a transformative shift, moving from traditional roles to positions that require a deeper understanding and integration of digital technologies (Schneider, 2016). As academic libraries evolve into dynamic digital information hubs, the need for digital competencies—skills and knowledge that empower individuals to use digital technology effectively—has been recognized as critical (Ferrari, 2013; Martin, 2008). However, despite this acknowledgment, significant challenges persist.

The rapid technological advancements, coupled with the explosive growth of digital resources, have led to a marked digital literacy deficit among librarians and patrons (Seadle, 2018). This deficit, if unaddressed, hinders effective navigation and utilization of digital tools integral to contemporary academic librarianship (Lewis, 2017). Moreover, the persistent digital divide amplifies these challenges, creating disparities in access and utility of digital services in academic libraries.

Furthermore, while the significance of bibliometric analysis in various disciplines of Library and Information Science (LIS) is well documented (Wallin, 2005), there is a discernible gap in literature when it comes to the in-depth bibliometric exploration of digital competencies within academic librarianship. The limited studies and fragmented insights on the subject leave academic institutions under-equipped to address the emergent challenges of the digital age and ensure equitable, effective service delivery (Fichman et al., 2014). This study, therefore, seeks to delve deep into this underexplored territory, aiming to bridge the literature gap and offer actionable insights to enhance digital competencies in academic librarianship.

Literature Review

The advent of the digital era heralds a profound paradigmatic shift in the realm of academic librarianship, necessitating the augmentation of digital competencies vital for librarians to provide superior services. Within this technologically saturated milieu, the prowess to adeptly maneuver digital technologies—a skill encapsulated under the umbrella term 'digital competencies—emerges as an integral facet of academic

librarianship. This suite of competencies transcends mere technical proficiency, morphing into a comprehensive understanding that encompasses the ethical creation, efficient management, and potent dissemination of information within the digital sphere. The attainment of these competencies empowers academic libraries to enhance research and instruction, thereby significantly enriching the academic landscape.

Saib et al. (2023) accentuate the non-negotiable need for dynamic adaptation and refinement of digital pedagogies in the field, shedding light on the pedagogical metamorphosis that contemporary academic librarians must undergo. Thorough assessments spotlight the intricate amalgamation of technology and pedagogy within the realm of online library instruction, thereby emphasizing the essential role of technology in redefining pedagogical practices. However, consensus on these complex dynamics within the scholarly community remains elusive, necessitating more targeted exploration and examination. Dialogues focusing on the role of academic librarians as pedagogical facilitators illuminate two crucial aspects: dexterity in pedagogical approaches and mastery in the digital domain. While a significant corpus of literature investigates these concepts in isolation, the interconnectedness of these domains and their collective impact on educational outcomes in digital environments call for further investigation. The evolving trajectory of modern pedagogical practices, propelled by the swift advancement of technology, is widely recognized within the academic community. Nonetheless, a conspicuous void persists regarding the intersectionality of digital pedagogies and academic librarianship, often limiting the discourse to rudimentary digital competencies such as the utilization of standard applications like MS Office. Empirical insights from Ciccone and Hounslow (2019) underscore the imperative for academic librarians to foster a robust theoretical understanding of curriculum development and pedagogy to design apt content for online environments. Concurrently, Chanetsa and Ngulube (2017) advocate for a harmonious equilibrium between technological and pedagogical competencies to assure effective educational outcomes.

O'Neil and Pegrum (2018) conducted a longitudinal investigation that shed light on the beneficial impact of digital technologies and related pedagogies on the development of academic librarians as professionals. The study documented significant enhancements in technological competencies and a more nuanced comprehension of pedagogies among the participants, effectively bridging the gap between digital technologies and pedagogical methodologies. The current landscape of academic librarianship necessitates the fusion of distinct skill sets comprising understanding digital learning theories, applying digital pedagogical strategies, effectively harnessing educational technologies, and actively engaging learners through digital mediums. Furthermore, the incorporation of contemporary pedagogical frameworks such as technological pedagogical content knowledge, substitution, augmentation, modification, redefinition, and the community of inquiry model is of supreme significance. These frameworks aid in metamorphosing learners into effective communicators, collaborators, and creative thinkers, thereby necessitating academic librarians to strategize, implement, reinforce, and provide feedback through these educational paradigms. The recognition and facilitation of information and knowledge-sharing communities of practice within academic librarianship have emerged as vital in today's digital epoch. These platforms stimulate invaluable collaboration, reflection, and engagement on digital teaching methodologies, pedagogies, skills, and digital tools integral to online library instruction, while also offering solutions to pressing queries regarding the role of academic librarians as educators within the realm of higher education. Having explored the fundamental aspects of digital competencies and the evolution of digital pedagogies, it becomes essential to observe these issues in a global context. Digital skills and pedagogies in academic librarianship are not universally adopted or understood, leading to discrepancies in the readiness and effectiveness of librarians around the world. Hence, a comparative analysis of these competencies is pertinent.

Embracing the critical essence of digital teaching methods is an urgent requirement in today's era of academic librarianship. The foundational grasp of education intertwined with technology paves the way to construct innovative online library guidance centered on the learner. To make a meaningful contribution when instructing within a digital space, academic librarians need to be versed in theories of online learning, principles of online instructional design, and the judicious application of pertinent digital teaching tools. Essentially, the knowledge gained from digital teaching methods can serve as a roadmap for librarians to impart instruction effectively within digital arenas. The aim is not to be merely reactive but to take a

proactive stance within the online milieu, engaging with technologies and teaching methodologies that promote student engagement. This includes project-based learning, learner-led pacing, asynchronous activities, and interactive learner tasks. However, this can only be achieved through an effective identification process of the skills necessary for online instruction within the current digital landscape.

At a global level, research on understanding the relationship between digital skills and pedagogies concerning academic librarianship appears unclear and somewhat indistinct. Regions like Zambia, Nigeria, Pakistan, Chile, and Botswana have shown that academic librarians with teaching responsibilities often display deficient digital competencies (Baro et al., 2019; Chanetsa and Ngulube, 2017; Chewe and Zulu, 2020; Khan, 2020). Challenges in these developing economies mainly stem from inadequate technological infrastructure, culminating in a lack of readiness at both individual and organizational levels for the digital era. Consequently, academic librarians find themselves striving to acquire navigational competencies in the digital space (Chewe and Zulu, 2020) instead of investigating and implementing relevant digital educational instruments for online library instruction. The situation is compounded by hurdles such as a lack of funding for training library professionals, a scarcity of physical resources, and a shortfall of proficient ICT educators (Baro et al., 2019). There's a glaring underemphasis on pedagogical knowledge and the role of technology in online library instruction. In stark contrast, in developed economies like Australia, Canada, the US, and the UK, academic librarians may exhibit digital skills, but these are usually associated with elementary computer operations and not with digital tools for learning and instruction (Martzoukou, 2020; Hess, 2019; O'Neil and Pegrum, 2018).

Further, research often limits the scope of digital skills to rudimentary computer knowledge, internet capabilities, database search abilities, electronic services, website design and management, computerized cataloguing, library software, digital preservation, document uploading, social media operation, MS Office applications, and the ability to use open-source software (Chewe and Zulu, 2020; Hiremath and Bankapur, 2019; Shahbazi and Hedayati, 2016). This narrow perspective sidelines the significance of digital teaching methods in online library instruction and the efficient use of technology-driven pedagogical content in academic librarianship. The systematic review thus arrives at the conclusion that while the pedagogical competencies of academic librarians have been extensively studied over the years, the interplay between the rise of technology and its impact on teaching practices is significantly underrepresented in current research (Withorn and Willenborg, 2020).

In summary, the evaluation and integration of pedagogies, technology, and digital competencies within academic librarianship are ongoing endeavors of considerable contemporary relevance. Librarians are expected to demonstrate proficiency in online learning theories, instructional design, and effective utilization of digital teaching tools, thereby ensuring their pedagogical practices are guided rather than dictated by technology. This transformative journey will foster a deeper engagement with learners in the digital sphere, thereby emphasizing the criticality of digital competencies within academic librarianship. The present study resides at this vital confluence of digital competencies and academic librarianship, aiming to thoroughly explore the current status and potential trajectories of digital competencies in this domain. By conducting a rigorous bibliometric analysis of peer-reviewed articles, this investigation seeks to identify burgeoning trends, forecast potential future pathways, and propose innovative research areas that could bridge the perceived chasms in the existing literature (Zhang, 2019). Moreover, the research highlights the potential of bibliometric methodologies in cultivating a deeper understanding of the ongoing discourse in the field, thus serving as a foundation stone for future scholarly endeavors (Thelwall, 2020).

Therefore, in our endeavor to bridge the existing lacuna in scholarly discourse, we embark on a bibliometric analysis of digital competencies. Our investigation is meticulously constructed to scrutinize global publishing trends on digital competencies, spanning the period from 2010 to 2023, with a particular focus on data amassed from Scopus.

Method

This section delineates the methodological blueprint embraced for the bibliometric analysis of digital

competencies in academic librarianship. The objective of the investigation is to fully address the following research questions:

Q1: What attributes define the bibliometric profile of digital competencies in academic librarianship spanning from 2010 to 2023?

Q2: What insights can be inferred about the evolution and impact of the field from 2010 to 2023, drawing from the annual trends in publication and citation?

Q3: Who have been the pivotal authors contributing to the field of digital competencies in academic librarianship, and what do their collaborative patterns and output reveal?

Q4: What are the most highly cited papers in the field of digital competencies in academic librarianship, and what does their citation frequency elucidate about their influence?

Q5: Which countries have wielded the most influence in the field of digital competencies in academic librarianship, based on their research output and citation impact?

Q6: Which journals have been the most frequented platforms for dissemination, and what keywords have been recurrent in the field of digital competencies in academic librarianship?

Q7: What are the key competencies, trends, and regional differences in digital competencies and academic librarianship as identified through the co-citation analysis of leading publications in the field?

These research questions served as the foundation for a thorough collection, selection, and analysis of the pertinent literature. The subsequent sections delineate the detailed procedural steps taken in this investigation.

Adherence to the PRISMA Statement

As previously stated, the bibliometric review strictly adhered to the PRISMA Statement, a benchmark for providing comprehensive reporting frameworks for systematic reviews (Moher et al., 2009). The robust review process involved the meticulous collection, selection, and appraisal of pertinent articles.

Data Collection

The review process commenced with a comprehensive exploration of the Scopus database, known for its wide-ranging coverage and credibility in academic research (Falagas et al., 2008). The search conducted on May 30, 2023, yielded a sizeable corpus of 61,731 documents focused on Digital Competencies.

Data Refinement and Selection

The data refinement process was precise and detail-oriented, utilizing Boolean operators and refined keyword filters. Inclusion criteria comprised articles published between 2010 and 2023, written in English, and directly exploring "digital competencies" and "academic librarian". Exclusion criteria ruled out non-English articles, opinion pieces, books, and articles with no direct relevance to the targeted search terms. Following the rigorous implementation of these criteria, a targeted subset of 144 articles was derived. A subsequent round of stringent selection, considering relevance, citation count, and publication prestige, further narrowed down the articles to 106, which served as the cornerstone for detailed analysis.

Data Examination

The selected articles were methodically assessed using a standardized data extraction form. This form ensured the consistent extraction of crucial information, including author(s), year of publication, journal name, keywords, citation count, and main findings. The data examination process yielded 106 articles, strictly pertinent to 'Digital Competencies' and 'Academic Librarian'.

Analysis

The analysis of the data gathered used Biblioshiny, a specialized program supported by the R environment. This software facilitated quantitative studies in scientometrics and bibliometrics, assisting in the comprehensive understanding of the research domain, its dynamics, and trends (Aria & Cuccurullo, 2017).

Quality Indicators

In this bibliometric analysis, indicators of article 'quality' or 'influence' were carefully considered. These

include the number of citations an article received, reflecting its impact and recognition within the academic community, and the Impact Factor (IF) of the publishing journal, indicating the journal's relative importance within its field (Garfield, 2006). Furthermore, the author's affiliations were noted, with a particular focus on the presence of highly recognized and influential research institutions. It should be noted that while these indicators can provide insights into an article's influence, they do not represent a comprehensive assessment of the quality of the research methodology or findings presented in the article.

Illustration

The research journey, starting from the expansive literature search to the final selection and assessment of articles, is visually represented in the PRISMA flow diagram (Figure 1). This illustrative depiction provides a holistic view of the robust and exhaustive research methodology implemented in this study.

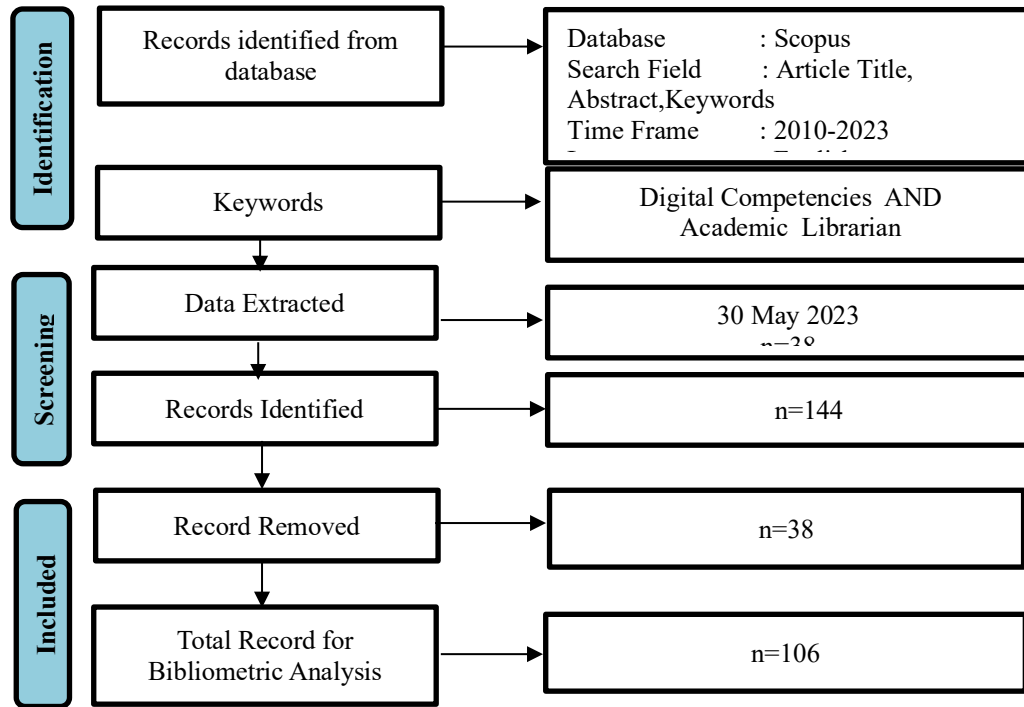


Figure 1: PRISMA flow diagram of literature retrieval (adapted from Moher et al., 2010)

Results

Bibliometric Profile

Table 1 provides a synoptic overview of the scholarly landscape surrounding digital competencies in academic librarianship from 2010 to 2023. During this period, a corpus of 106 articles, each with a mean age close to five years, has been amassed. This signifies the timeliness and relevance of the research theme. The average citation frequency per document approximates 6.528, illustrating the resonance of these works within the scholarly community and their efficacy in propelling further investigations. The metric of 4.94, potentially delineating either the annual citations per paper or the average annual rate of article output, underscores a steady engagement with the subject. Furthermore, the participation of 223 unique authors underscores a vibrant research environment typified by a high degree of collaborative endeavor. Collectively, this data elucidates an ongoing, active, and collaborative scholarly engagement in understanding and enhancing digital competencies within the sphere of academic librarianship.

Table 1: Primary information on relevant articles

Description	Results
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Duration	2010 - 2023
Documents types (articles)	106
Document average age	4.94
Average citations per document	6.528
Average per year for each document	4.94
Authors	223

Publication and Citation Trends

By reviewing both the comprehensive year-by-year breakdown provided in Table 2 and the graphical visualization of citation trends in Figure 2, we gain a deep understanding of scholarly production and impact trends in the field of digital competencies in academic librarianship from 2010 to 2023. Table 2 elucidates the consistent scholarly attention this topic has received over the years, as evidenced by a steady flow of article publications. Presumably, Figure 2 provides a complementary perspective by graphically illustrating the annual citation trends, which enhances the insights garnered from Table 2. The visual representation most likely accentuates the increasing influence of research in this area, potentially showcasing a steady or growing citation trend over time. This side-by-side analysis of publication and citation trends offers an insightful view into the dynamic scholarly interest and the resonating influence of research on digital competencies in academic librarianship. The collective interpretation of both Table 2 and Figure 2 reveals not just the vibrancy of this research domain, but also the ripple effect of its scholarly contributions, indicating promising prospects for continued scholarly interest and investigations in the future.

Table 2: Annual publication trends and citations

Year	Articles	MeanTCperArt	MeanTCperYear	CitableYears
2023	4	0.75	0.75	1
2022	13	0.92	0.46	2
2021	15	1.47	0.49	3
2020	14	2.79	0.70	4
2019	12	3.83	0.77	5
2018	6	3.5	0.58	6
2017	7	14.14	2.02	7
2016	10	10.1	1.26	8
2015	8	11.75	1.31	9
2014	4	12.5	1.25	10
2013	5	8.6	0.78	11
2012	1	8	0.67	12
2011	3	9	0.69	13
2010	4	31.75	2.27	14

Total	106	119.1	14	105
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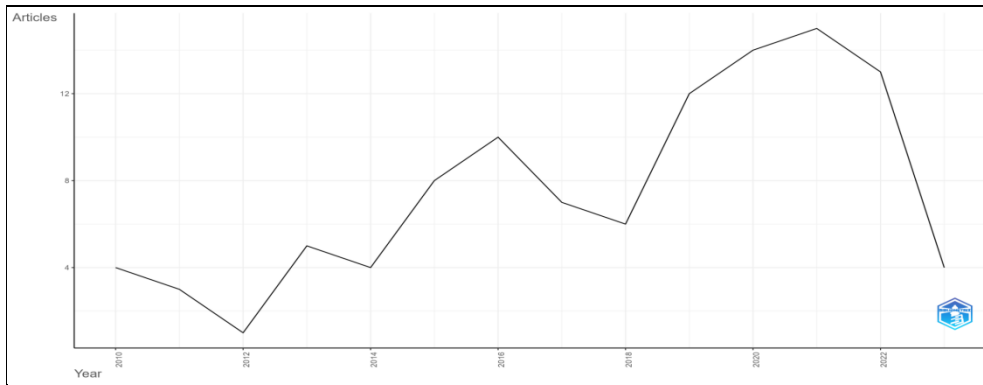


Figure 2: Annual citations trends

Authorship Contribution

Informed by Figure 3 and Table 3, it's notable that authorship within the field of digital competencies in academic librarianship exhibits both individual and collaborative efforts. The top five contributors have produced between two and four articles each, suggesting a consistent engagement with the field. The fractionalized article count, ranging from approximately 0.67 to 2.00, underscores the collaborative nature of research, as it takes into account shared contributions across multiple authors. This authorship pattern serves to demonstrate the synergistic knowledge creation in the domain of digital competencies for academic librarians.

Table 3: Most productive authors

No	Authors	Articles	Articles Fractionalized
1.	Batool SH	4	1.08
2.	Raju J	3	2.00
3.	Shahbazi R	3	1.17
4.	Al-Fadel M	2	0.67
5.	Aslam M	2	1.25

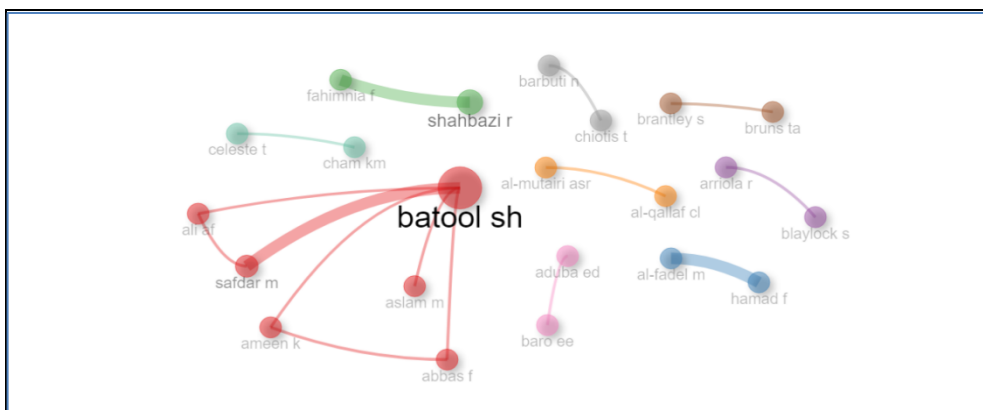


Figure 3: Visual depiction of authorship contributions

Highly Cited Articles

Table 4 elucidates the foremost scholarly contributions in the realm of digital competencies within academic librarianship, as indicated by citation frequency. Collectively, these distinguished papers have procured a total of 153 citations, marking their considerable influence and importance in the scholarly discourse. Leading the register is a seminal work by Ayoku and Okafor (2015) addressing ICT skill acquisition within the context of Nigerian university libraries, which alone accounts for 26 citations. It is closely trailed by an insightful examination of digital literacy skills in African university libraries by Baro, Obaro, and Aduba (2019), contributing another 21 citations. Interestingly, a recent publication by Hamad, Al-Fadel, and Fakhouri (2021) scrutinizing the effects of librarians’ digital skills in Jordanian academic libraries, despite its recency, has rapidly accrued 8 citations. This fact underscores its immediate pertinence and impact within the discourse. Concluding the list, a 2012 study by Kim, Warga, and Moen examining digital curation in the academic library job market, though placed at the list's end, continues to significantly resonate within the field, as evidenced by its enduring citation count of 8.

Table 4: Most cited papers

Author	Title	DOI	Total Citations	TC per Year	Normalized TC
Ayoku, O.A. and Okafor, V.N. (2015)	ICT skills acquisition and competencies of librarians: Implications for digital and electronic environment in Nigerian universities libraries	10.1108/EL-08-2013-0155	26	2.89	1.53
Baro, E.E., Obaro, O.G. and Aduba, E.D. (2019)	An assessment of digital literacy skills and knowledge-based competencies among librarians working in university libraries in Africa	10.1108/DLP-04-2019-0013	21	4.20	3.28
Mansour, E. (2017)	A survey of digital information literacy (DIL) among academic library and information professionals	10.1108/DLP-07-2016-0022	21	3.00	2.00
Ford, E., Izumi, B., Lottes, J. and Richardson, D. (2015)	Badge it! A collaborative learning outcomes based approach to integrating information literacy badges within disciplinary curriculum	10.1108/RSR-07-2014-0026	20	2.22	1.18
Blummer, B., & M. Kenton, J. (2014)	Reducing Patron Information Overload in Academic Libraries	10.1080/10691316.2014.906786	15	1.50	1.02
Thomas, W. J. (2013)	The Structure of Scholarly Communications Within Academic Libraries	10.1016/j.serrev.2013.07.003	15	1.36	1.74

Schwartz, J. (2018)	Visual literacy: academic libraries address 21st century challenges	10.1108/RSR-04-2018-0048	10	1.67	1.67
Lefevre, J., & Huwe, T. K. (2013)	Digital publishing from the library: a new core competency.	10.1080/19322909.2013.780519	9	0.82	1.05
Hamad, F., Al-Fadel, M., & Fakhouri, H. (2021).	The effect of librarians' digital skills on technology acceptance in academic libraries in Jordan.	10.1177/096100620966644	8	2.67	3.76
Kim, J., Warga, E., & Moen, W. (2012).	Digital curation in the academic library job market.	10.1002/meet.14504901283	8	0.67	1

Geographic Impact and Influence in Digital Competencies and Academic Librarianship

The figures presented in Table 5 and Figure 4 underscore the vast international interest and contributions to the study of digital competencies in academic librarianship. The United States stands out as a major contributor, generating 39 publications which constitute 27.08% of total publications and amassing a remarkable 220 citations. This reflects the country's prominent role in advancing this academic field.

Following the United States, Nigeria and Pakistan also exhibit significant contributions with 19 publications each, accounting for 13.19% of total publications. Furthermore, Nigeria has garnered 50 citations, signifying its influential work in this domain. Further demonstrating the international relevance of digital competencies in academic librarianship, other countries such as India, China, Italy, and Spain show considerable representation in terms of publication output. In addition, Spain holds its own in terms of citation impact, with 72 citations. In total, these contributions from around the globe represent a sum of 493 citations, underscoring the widespread influence and the global relevance of research into digital competencies in academic librarianship.

Table 5: Geographical distribution

No	Country	Total Publication	% of Publication
1	USA	39	27.08
2	NIGERIA	19	13.19
3	PAKISTAN	19	13.19
4	INDIA	13	9.03
5	CHINA	10	6.94
6	ITALY	10	6.94
7	SPAIN	10	6.94
8	SOUTH AFRICA	7	4.86
9	IRAN	5	3.47
10	AUSTRALIA	4	2.78
11	MEXICO	4	2.78
12	UK	4	2.78
Total		144	100.00

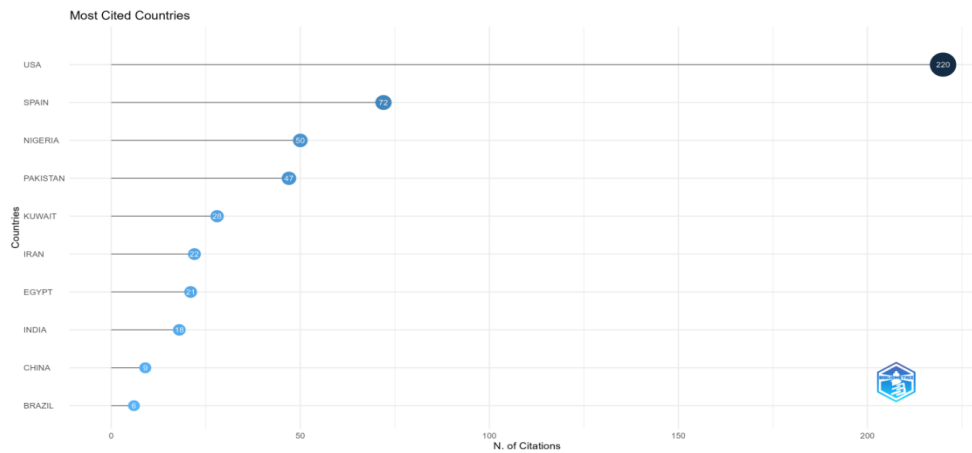


Figure 4: Most cited countries

Most Frequent Journals and Most Common Keywords Used

Table 6 displays the most frequently utilized journals for research in this field over the years, with "Library Philosophy And Practice" consistently showing high publication numbers. Other significant contributors include "Digital Library Perspectives", "Electronic Library", and "Journal Of Academic Librarianship". This distribution is indicative of the leading journals in this research space, providing important platforms for disseminating work on digital competencies in academic librarianship. Moving to Figure 5, it outlines the most prevalent keywords associated with digital competencies and academic librarianship. Among the terms, "human", "librarian", "design/methodology/approach", and "library" were most frequently employed. Other recurring keywords, such as "education", "learning", "libraries", and "skill", further underscore the main themes and areas of focus within the field. A total of 96 instances of these keywords were identified, reflecting a diverse range of research topics and interests under the umbrella of digital competencies in academic librarianship.

Table 6: Frequent journals

Year	Library Philosophy And Practice	Digital Library Perspectives	Electronic Library	Journal Of Academic Librarianship	Evidence Based Library And Information Practice	Global Knowledge, Memory And Communication	Journal Of Education For Library And Information Science	Serials Librarian	Serials Review	Vjesnik Bibliotekara Hrvatske
2023	10	4	4	4	3	3	3	3	3	3
2022	10	4	4	4	3	2	3	3	3	3
2021	10	4	4	3	3	1	3	3	3	1
2020	5	3	4	3	3	1	2	3	3	1
2019	4	2	4	3	1	0	0	3	2	0
2018	2	1	4	2	0	0	0	2	2	0
2017	2	1	4	2	0	0	0	2	2	0

2016	2	0	3	2	0	0	0	2	2	0
2015	2	0	2	1	0	0	0	1	2	0
2014	2	0	0	1	0	0	0	0	2	0
2013	2	0	0	0	0	0	0	0	2	0
2012	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0

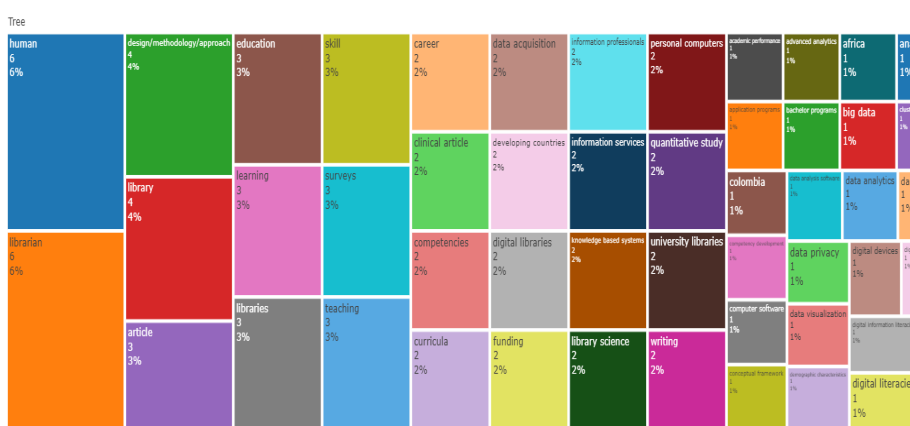


Figure 5. Frequent keywords

Co-Citation Analysis: Exploring Digital Competencies and Academic Librarianship

This co-citation analysis illuminates salient themes within the landscape of digital competencies and academic librarianship, as shown by Figure 6. The ensuing discussion concentrates on pivotal areas such as necessary qualifications, competencies, and digital literacy skills indispensable for the academic librarian in the contemporary, digitally-oriented information landscape. The co-citation analysis foregrounds the importance of an array of skills and competencies for today's academic librarians. Works by Huwe (2004), Kwasik (2002), and Vonthacumjane (2011) underscore the need to continuously update web skills, nurture qualifications for service librarian roles in digital environments, and equip the new generation of LIS professionals with key competencies. Ayoku and Okafor (2015) and Raju (2014) both stress the importance of ICT skills and knowledge in this digital era.

The theme of digital literacy repeatedly emerges throughout the co-cited literature. Bawden (2008) delves into the origins and concepts of digital literacy, while Mpemiri (2015) explores digital literacy skills among librarians, thereby suggesting the centrality of digital literacy to the modern librarian's repertoire.

Several co-cited works focus on the context of academic libraries and the education of digital librarians. Graham (2003) discusses the transformation of libraries into essential computer labs supporting productivity, while Campbell (2006) deliberates on the process of transitioning to an academic library. Choi and Rasmussen (2006) and Tamaro (2007) pose important considerations for the education of future digital librarians.

Several authors present case studies or perform job analyses to better understand the skills and competencies needed in the field. Safahieh and Asemi (2007) present a case study of librarians' computer

literacy skills, while Choi and Rasmussen (2009) undertake a job advertisement analysis for digital librarian positions. This real-world evidence provides tangible insights into the demands of the field.

The global interest in digital competencies and academic librarianship is evident, with references spanning from Nigeria (Ayoku & Okafor, 2015; Mpemiri, 2015) to Europe (Tamarro, 2007). These variegated geographical perspectives underline the global significance of these issues. Several works provide methodological insights, notably Braun and Clarke (2006) for their exposition on using thematic analysis in psychology. These methodological contributions underscore the value of robust research methods in the investigation of key competencies in academic librarianship.

In conclusion, this co-citation analysis offers a multifaceted understanding of digital competencies and academic librarianship's intricacies. The importance of continuous development and adaptation of skills and competencies in an increasingly digital milieu is highlighted. The continuous evolution of these fields necessitates the constant updating and expansion of skills for those operating within them, particularly in academic librarianship.

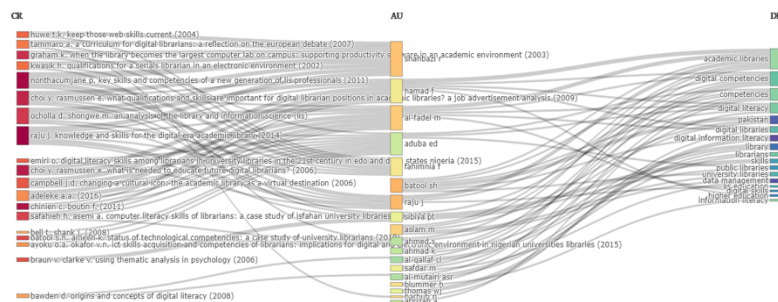


Figure 6: Visual representation of co-citation analysis in the field of digital competencies and academic librarianship

Discussions

This study adds a lot to what has already been written by doing a thorough bibliometric analysis of academic librarianship and digital competencies in the Scopus database. To our knowledge, this is the first bibliometric study to provide an in-depth examination of the multifaceted nature of digital competencies within the realm of academic librarianship in Scopus. These facets include:

- Digital Literacy: - The capacity to identify, evaluate, use, disseminate, and create content utilizing digital technologies and the Internet (Bawden, 2008).
- Technical Proficiencies: The understanding and adept utilization of digital technology, software, and Internet applications, from basic computer operation to advanced programming and data analysis skills (Ayoku & Okafor, 2015).
- Online Communication and Collaboration: The Skillset for Leveraging Digital Tools for Communication and Collaboration, such as Electronic Mail, Social Networking Platforms, and Collaborative Digital Interfaces (Choi & Rasmussen, 2006)
- Digital Safety and Security: the comprehension of potential digital threats and the application of preventive measures to safeguard oneself and one's data online, encompassing the use of strong passwords and caution against potential digital scams (Huwe, 2004).
- Digital Ethics and Legal Conduct: The conscious understanding of the rights and responsibilities linked with digital citizenship, covering matters related to copyright, privacy, and suitable online behavior (Kwasik, 2002)

By integrating a comprehensive analytical perspective, this study yields a holistic understanding of digital competencies and academic librarianship, thereby filling a critical knowledge gap in the literature. Further,

this comprehensive approach underscores the multifaceted nature of digital competencies and the paramount importance of these competencies within the complex landscape of academic librarianship, as articulated within Scopus literature. Hence, this study serves as a fundamental reference point for subsequent bibliometric analyses and studies in the field, particularly those focusing on the role of digital competencies within academic librarianship.

Trends in Scholarly Production and Impact

This research offers comprehensive insights into the dynamic field of digital competencies within academic librarianship. A granular year-on-year analysis and the visual depiction of citation trends collectively showcase the ongoing scholarly interest and the growing influence of this field. The dual interpretation of these data representations illuminates the vibrancy and far-reaching impact of the domain, indicating a future rich with academic exploration. This bibliometric study, aligning with Aharony's (2006) assertion, crucially contributes to understanding the evolving knowledge structure in this area.

Assessing Authorship and Influence in Digital Competencies Research

The data showcases extensive international involvement and a wide array of contributions to the field of digital competencies in academic librarianship. The United States emerges as a principal contributor, which is evident through its notable number of publications and citations. However, this dominance might indicate a potential bias towards developed countries in research focus and dissemination, which might limit a more inclusive global understanding. Following closely, Nigeria and Pakistan mark their presence as considerable contributors. The notable number of citations attributed to Nigeria's work bears testimony to its influence. However, the uneven ratio of Nigeria's citations compared to its publications might prompt the question of whether a more diverse scholarly base could be achieved with a larger research output

Other nations like India, China, Italy, and Spain demonstrate significant representation, underscoring the global significance and appeal of this field. Yet, an apparent contradiction exists between the robust citation records of countries such as Spain and their potential to impact the field more substantively through increased publication. Several scholarly works, distinguished by their high citation frequencies, denote their critical role in shaping the discourse. Nevertheless, a scrutinizing perspective should be employed to assess the breadth of topics encompassed in these highly cited works—does it reveal a skewed focus on particular aspects of digital competencies while others remain understudied? Authorship patterns exhibit a blend of individual initiatives and collaborations. Batool SH spearheads the list with four publications, which amounts to a fractionalized count of 1.08, demonstrating her significant productivity. Despite the clear collaborative nature of the research, the fractionalized count system may fail to fully recognize the contributions of individual researchers who may serve as secondary authors in multiple publications. The inherent limitations of the system necessitate discussion for a more equitable evaluation of individual contributions (Enakrire, Chisita, & Adeyinka, 2020).

Analyzing Key Journals and Dominant Themes in Digital Competency Research

A variety of influential publications and recurring themes have shaped the academic discourse surrounding digital competencies in librarianship. Certain journals have emerged as pivotal nodes for this scholarly exchange. "Library Philosophy And Practice" is a consistent venue for such discourse, alongside notable platforms like "Digital Library Perspectives", "Electronic Library", and "Journal Of Academic Librarianship". Such distribution, as indicated by Haddow and Mamtora (2017), signifies the gatekeeping role these journals play in determining the field's scholarly conversation.

Keywords, acting as guideposts in the research landscape, facilitate navigation through the vast expanse of studies on digital competencies. The terms "human", "librarian", "design/methodology/approach", and "library" are frequently employed, suggesting their centrality in the discourse. However, the frequent recurrence of some keywords over others raises the question: is the field's discourse being dominated by a select few themes, potentially overshadowing others?

The appearance of additional keywords such as "education", "learning", "libraries", and "skill" underscores the diverse areas of focus within the field. However, the dynamic interplay of these keywords calls for a

deeper examination: are there unspoken hierarchies of importance being established through their usage frequency? The identification of 96 instances of these keywords paints a picture of a complex interplay of various research topics and interests. Nevertheless, one could question whether the field's scope is expansive enough or if it is being unduly confined by focusing predominantly on these keywords. So, digital competencies in academic librarianship cover a wide range of research topics and interests. However, the discussion could benefit from a more balanced presentation of the different themes and a conscious effort to challenge the norms that are already in place.

Implications and Future Research Directions

The findings of this comprehensive bibliometric analysis underscore the pressing need for enhancing digital competencies within academic librarianship, particularly in developing countries. Recognizing this need, future research initiatives should prioritize the systematic assessment of these competencies in such regions. The adoption of such routine practices could aid in tailoring library services more effectively to user needs, thereby fostering user-oriented and efficient libraries. The proficiency of library staff in modern, technological, and leadership skills emerges as a crucial determinant of service quality. Hence, to keep pace with the rapidly evolving digital landscape, there is an imperative need for libraries to provide regular professional development opportunities to their staff. Tripartite collaborations among professional library associations, library schools, and librarian organizations could be a promising avenue for fostering such skill development. Equipped with contemporary skills and facilitated by updated resources and infrastructure, library professionals can spearhead the transformation of libraries into dynamic learning hubs at the heart of academic institutions.

While the focus of this bibliometric study has been academic libraries, future research could extend this exploration to other library types, including public, national, and special libraries. Such inclusive studies could shed light on the broader spectrum of digital competence requirements in the library sector, enabling the development of modern and user-centric services that align with evolving user expectations. In terms of research methodologies, while the present study adopted a predominantly quantitative approach, future research could also leverage qualitative methodologies. Such methodologies could unearth deeper, more nuanced insights into user needs and expectations, guiding the development of more user-focused services and resources. Ultimately, these research directions can contribute to enhancing the perceived value of libraries and promoting their evolution in harmony with the digital age. The inherent interplay of pedagogical and digital competencies in academic librarianship also presents compelling avenues for future research. These research directions could significantly contribute to the enrichment of academic librarianship, the advancement of digital pedagogy, and the enhancement of user experiences in libraries globally. By undertaking such studies, we can look forward to a future where libraries are not just repositories of information but also dynamic hubs of learning and innovation.

Conclusion

This thorough bibliometric analysis gives important information about the landscape of digital competencies in academic librarianship. It shows how pedagogical and digital competencies work together to shape the future of this important field. The breadth of global research engagement underscores the universal significance of digital competencies, highlighting substantial contributions from both economically developed and developing nations. Regardless of the level of economic development, the issue of digital competencies and academic librarianship persists, as technology evolution is a ubiquitous phenomenon. This study outlines a spectrum of digital competency themes, emphasizing the necessity for routine upskilling opportunities to enable library staff to keep pace with rapidly evolving digital technologies. Such advancements accentuate the role of human resources in maximizing the benefits of digital transformation. However, the study also acknowledges the profound challenges that lie ahead. The relentless progression of technology presents a daunting prospect: librarians must continually adapt and demonstrate proficiency in a growing array of digital tools and platforms to mitigate the risk of obsolescence. Indeed, the risk of technology supplanting jobs due to insufficient digital competencies is not merely speculative but a potential reality. This underlines the urgency for academic librarians to equip

themselves with the requisite digital competencies to prevent a significant diminishment or replacement of their roles by advanced technologies. In conclusion, this study urges the academic librarianship community to navigate this evolving paradigm with informed understanding, critical insight, and steadfast dedication. The impending challenges are as vast as they are compelling, heralding a future necessitating continuous learning and adaptation. Only through an unwavering commitment to growth and innovation can academic librarians safeguard their irreplaceable role in the digital era. Moving forward, this research encourages future studies to expand the scope of the bibliometric analysis to include additional databases and gray literature to develop a more holistic understanding of the field. Moreover, in-depth qualitative research, such as case studies and interviews, could provide further insights into the practical implementation of digital competencies in different contexts. Finally, longitudinal studies could offer a deeper understanding of the evolution of digital competencies in librarianship, aiding in anticipatory planning and proactive skill development strategies.

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