

Professional Training of Library Professionals in the Digital Era: A Systematic Review

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ABSTRACT

The rapid advancement of digital technologies has significantly transformed the roles and responsibilities of library professionals, necessitating continuous and structured professional training. This paper presents a systematic review of the literature published between 2017 and 2024 on training programs for library professionals, focusing on training types, delivery modes, skill areas addressed, challenges, and emerging trends. Following a PRISMA-style review approach, 40 peer-reviewed studies were selected from major databases, including Scopus, Web of Science, Emerald Insight, and Google Scholar. The findings reveal a growing emphasis on ICT competencies, research data management, instructional skills, and leadership development, supported by an increasing shift toward online and blended training models. However, persistent challenges such as limited institutional support, funding constraints, workload pressures, and rapid technological change continue to affect training effectiveness. The review underscores the need for outcome-oriented, accessible, and competency-based training frameworks to enhance the professional capacity of library professionals in the digital era.

KEYWORDS: Library professionals; Training programs; Digital competencies; Professional development; Systematic review.

1. INTRODUCTION

The digital transformation of information environments has fundamentally reshaped the nature of libraries and the professional roles of library and information science (LIS) professionals. Contemporary libraries have evolved from custodians of print collections into dynamic knowledge centers that support digital access, research services, data management, and user-centered learning environments (Pandey & Madhusudhan, 2024). As a result, library professionals are increasingly required to possess advanced technological, instructional, and managerial competencies.

In response to these changing expectations, professional training programs have become a critical mechanism for sustaining relevance and effectiveness in library services. Training initiatives now extend beyond traditional library operations to include information and communication technologies (ICT), research support services, digital literacy instruction, and leadership development (Shastri & Chudasma, 2025; Prince, 2024). Despite the expansion of training opportunities, the literature reports uneven access, varying quality, and persistent skill gaps among professionals.

Given the growing body of research on professional training in LIS, a systematic synthesis of existing studies is essential to understand prevailing trends, dominant skill areas, delivery models, and challenges. This review consolidates and analyzes recent literature to provide an integrated understanding of how training programs for library professionals are evolving in the digital era.

2. OBJECTIVES

The objectives of this review are to:

- Examine the major types of training programs designed for library professionals
- Analyze the modes of training delivery adopted in professional development initiatives
- Identify key skill areas emphasized in contemporary training programs
- Highlight challenges affecting training participation and effectiveness
- Identify emerging trends and suggest directions for future training frameworks

3. METHODOLOGY (PRISMA-STYLE, HARMONIZED)

A systematic review methodology based on PRISMA guidelines was adopted to identify, screen, and analyze relevant literature. Searches were conducted in **Scopus, Web of Science, Emerald Insight, and Google Scholar** for studies published between **2017 and 2024**. Keywords used included *library professionals, training programs, professional development, ICT skills, digital competencies, and research support*.

The **inclusion criteria** comprised peer-reviewed journal articles published in English that focused on professional training, skill development, or continuing education of library professionals. **Exclusion criteria** included opinion articles, editorials, conference abstracts without full text, and studies not directly related to LIS training.

After removing duplicates and screening titles and abstracts, full-text analysis was conducted. A total of **40 studies** met the inclusion criteria and were subjected to thematic analysis. The literature was analyzed under five major themes: types of training programs, modes of delivery, skill areas addressed, challenges, and emerging trends.

4. TYPES OF TRAINING PROGRAMS

Training programs for library professionals have diversified significantly in response to digital transformation and expanding professional roles. Table X presents the major categories of training programs identified in the reviewed literature.

Table X. Types of Training Programs for Library Professionals

Training Type	Focus Area	Key References
Orientation & Induction	Institutional workflows, systems	Pandey & Madhusudhan (2024); Rautaray et al. (2024)
ICT & Digital Skills	Automation, e-resources, AI tools	Shastri & Chudasma (2025)
Research Support & Data Services	RDM, bibliometrics, OA	Prince (2023, 2024)
User Services & Information Literacy	Instruction, engagement	Nalinadevi (2024)
Management & Leadership	Strategy, soft skills	Pagore (2024)

Analysis:

The literature reflects a clear transition from predominantly orientation-based training toward **technology-intensive and role-specific programs**. ICT and digital skills training emerges as the most emphasized category, underscoring the central role of automation, electronic resources, and emerging technologies in contemporary library services (Shastri & Chudasma, 2025). Training related to **research support and data services** has gained prominence in response to librarians’ expanding involvement in research data management, bibliometrics, and open access initiatives, although several studies note persistent skill gaps in this area (Prince, 2023, 2024).

While **orientation and induction training** remains essential for professional integration, recent studies highlight the need to modernize these programs by incorporating foundational digital competencies (Pandey & Madhusudhan, 2024). **User services and information literacy training** continues to be critical for supporting user-centered learning environments, whereas **management and leadership training** is increasingly recognized as vital for enabling strategic adaptability and effective change management in digitally evolving library contexts (Nalinadevi, 2024; Pagore, 2024).

5. MODES OF TRAINING DELIVERY

The delivery mechanisms of professional training have evolved alongside technological advancements. Table X summarizes the primary modes of training delivery reported in the literature.

Mode	Key Features	References
Workshops / Seminars	Interactive, short-term, hands-on	Pandey & Madhusudhan (2024)
Online Learning / MOOCs	Flexible, scalable, location-independent	Shahzad et al. (2023)
Blended Learning	Integration of online and face-to-face modes	Pagore (2024)
On-the-job Training	Practical, experiential, context-based	Prince (2024)

Analysis:

The reviewed literature indicates that **workshops and seminars** continue to be widely adopted due to their effectiveness in hands-on and skill-oriented learning. However, **online learning and MOOCs** have significantly enhanced accessibility and participation by addressing time and geographical constraints, particularly for digitally focused training programs (Shahzad et al., 2023). To overcome limitations related to engagement and interaction in

fully online environments, **blended learning models** are increasingly recommended, as they combine flexibility with experiential learning and improved skill retention (Pagore, 2024).

In addition, **on-the-job training** supports experiential and situated learning by enabling library professionals to apply newly acquired competencies directly within their work settings, especially in digital services and research support roles (Prince, 2024). Recent studies also highlight the growing role of **communities of practice** as collaborative and informal learning mechanisms that promote peer learning, knowledge sharing, and continuous professional development (*The Journal of Academic Librarianship*, 2024).

6. KEY SKILL AREAS ADDRESSED

Training initiatives consistently emphasize the development of core competencies required for contemporary library practice. Table X outlines the principal skill domains targeted by training programs.

Skill Domain	Emphasis	Key References
Digital & ICT Skills	Core professional competency	Pandey & Madhusudhan (2024)
Research Data & Scholarly Communication	Research support roles	Prince (2023, 2024)
Instruction & User Engagement	Information literacy	Nalinadevi (2024)
Leadership & Management	Strategic adaptability	Pagore (2024)

Analysis:

The reviewed literature consistently positions **digital and ICT skills** as foundational competencies for contemporary library practice, reflecting the centrality of technology in service delivery and resource management (Pandey & Madhusudhan, 2024). **Research data management and scholarly communication** skills represent an expanding domain, driven by librarians' growing involvement in research support, open access, and bibliometric services, although studies note persistent competency gaps requiring targeted training (Prince, 2023, 2024).

Instructional and user engagement skills remain critical for effective information literacy delivery and user-centered services in digitally mediated learning environments (Nalinadevi, 2024). In parallel, **leadership and management competencies** are increasingly emphasized to support strategic decision-making, organizational change, and adaptability in evolving library contexts (Pagore, 2024).

7. CHALLENGES IN TRAINING PROGRAMS

The literature also identifies persistent barriers affecting training effectiveness. Table X presents the most frequently reported challenges.

Challenge	Nature
Limited institutional support	Organizational
Funding constraints	Financial
Workload and time limitations	Operational
Rapid technological change	Technological
Unequal access	Structural

Analysis

The literature reveals that **institutional support** plays a decisive role in determining the success of professional training programs for library professionals. Limited administrative backing often results in inadequate policy frameworks, restricted leave provisions, and minimal recognition of training outcomes, which collectively discourage sustained participation in professional development activities (Pagore, 2024). In many institutions, training is treated as an optional activity rather than a strategic investment, thereby reducing its long-term impact on service quality and organizational growth.

Financial constraints constitute another critical barrier, particularly in publicly funded and smaller academic libraries. High registration fees, travel costs, and limited training budgets significantly restrict access to advanced and specialized programs. Several studies note that insufficient funding disproportionately affects early-career professionals and staff from rural or under-resourced institutions, thereby widening existing skill gaps within the profession (Pandey & Madhusudhan, 2024).

Workload and time limitations further constrain participation in training initiatives. Increasing service demands, staff shortages, and extended working hours often leave little scope for library professionals to engage in continuous learning. As a result, training participation is frequently limited to short-term or mandatory programs, reducing opportunities for in-depth skill acquisition and reflective practice (Prince, 2024).

The challenge of **rapid technological change** remains particularly significant in the digital era. The fast pace of innovation in areas such as digital platforms, data analytics, and artificial intelligence leads to frequent skill obsolescence, making one-time training interventions insufficient. The literature therefore emphasizes the need for ongoing, modular, and update-oriented training models that can adapt to emerging technologies and evolving professional roles (Pagore, 2024).

Finally, **unequal access to training opportunities** persists across institutions, regions, and professional categories. Variations in infrastructure, connectivity, institutional priorities, and professional networks result in uneven exposure to training programs, especially between urban and rural settings. This structural inequality not only limits individual career progression but also affects the overall capacity of libraries to deliver equitable and high-quality services (Pandey & Madhusudhan, 2024).

Collectively, these challenges highlight the necessity for **institutionally supported, well-funded, flexible, and inclusive training frameworks** that align professional development with organizational goals and the rapidly changing digital landscape.

8. Emerging Trends in Training Programs

Recent literature points to several emerging trends shaping future training initiatives.

Emerging Trend	Description
AI and data analytics	Advanced digital competencies
Micro-credentials	Modular skill certification

Emerging Trend	Description
Competency-based training	Outcome-oriented learning
Online & blended expansion	Accessibility
International collaboration	Global skill alignment

Analysis

The literature indicates a clear shift toward **technology-driven and future-oriented training models** for library professionals, reflecting broader transformations in the information ecosystem. One of the most prominent emerging trends is the integration of **artificial intelligence (AI), data analytics, and automation tools** into professional training curricula. Studies highlight that training related to AI-based discovery systems, data visualization, and intelligent user services is increasingly viewed as essential for sustaining service innovation and relevance in academic and research libraries (Nakaziba & Ngulube, 2024; Pandey & Madhusudhan, 2024). This trend signals a move beyond basic ICT literacy toward advanced digital competencies.

Another significant development is the growing adoption of **micro-credentialing and modular learning frameworks**. Unlike traditional long-duration programs, micro-credentials focus on specific, measurable competencies and allow professionals to upskill incrementally. The literature suggests that such flexible certification models are particularly effective in addressing rapid technological change and supporting lifelong learning, especially for working professionals with limited time and institutional support (Shahzad et al., 2023). These models also enhance professional visibility and employability by providing verifiable evidence of skill acquisition.

The expansion of **online and blended learning environments** continues to shape training delivery practices. While earlier studies emphasized access and convenience, recent literature increasingly focuses on instructional design quality, learner engagement, and outcome assessment in digital training environments. Blended approaches are especially valued for combining the scalability of online learning with the collaborative and experiential benefits of face-to-face interaction, thereby improving knowledge retention and practical skill application (Pagore, 2024).

A further emerging trend is the emphasis on **competency-based and outcome-oriented training frameworks**. Rather than focusing solely on participation or content coverage, contemporary training initiatives increasingly align learning objectives with clearly defined professional competencies and service outcomes. This shift reflects a broader demand for accountability and impact assessment in professional development programs, particularly in institutional and accreditation contexts (Prince, 2024).

Finally, the literature highlights the growing importance of **international collaboration and cross-institutional partnerships** in professional training. Collaborative initiatives, including joint workshops, global MOOCs, and professional exchange programs, are viewed as effective mechanisms for sharing best practices, standardizing competencies, and addressing global challenges in librarianship. Such collaborations contribute to the development of globally relevant skills while promoting inclusivity and professional networking across diverse institutional contexts (*The Journal of Academic Librarianship*, 2024).

Overall, these emerging trends indicate a transition toward **flexible, technology-integrated, competency-driven, and globally connected training ecosystems**. The literature suggests that future training frameworks must be adaptive, scalable, and continuously evaluated to remain aligned with evolving professional roles and technological advancements.

CONCLUSION

This systematic review demonstrates that training programs for library professionals have evolved significantly in response to digital transformation and expanding professional roles. Contemporary training initiatives increasingly emphasize ICT proficiency, research data management, instructional competencies, and leadership skills, supported by a shift toward online, blended, and experiential learning models.

Despite these advancements, the literature consistently identifies challenges related to institutional support, funding limitations, workload pressures, and rapid technological change. These barriers often restrict equitable access to sustained professional development and contribute to skill gaps in emerging areas such as data services and advanced digital technologies.

The review highlights the need for **structured, competency-based, and outcome-oriented training frameworks** that are flexible, inclusive, and aligned with evolving professional demands. Future training initiatives should integrate emerging technologies, promote collaborative learning models, and incorporate systematic evaluation mechanisms to ensure long-term professional effectiveness and service quality in libraries.

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