



## Exploring ICT Skills and Competencies among LIS Professionals: A Systematic Review

Madhu Yadav  
Post Graduate Student  
Department of Library and Information Science  
University of Delhi

Madhusudhan Margam  
Professor  
Department of Library and Information Science  
University of Delhi

Shahil Soni  
Research Scholar  
Department of Library and Information Science  
University of Delhi

Parbati Pandey  
Research Scholar  
Department of Library and Information Science  
University of Delhi

### Abstract

To compete for positions in automated libraries, library professionals must acquire ICT skills and competencies due to the increased demand for IT-savvy library workers. To fully implement such skills in libraries and optimise their impact on professional competency, several challenges and problems must be resolved. This study systematically reviews the previous literature available in the area of ICT skills and competencies of LIS professionals. The study reviews the most significant publications in the area of research of the last six years by filtering all the literature through PRISMA guidelines. Literature has been retrieved through the WoS and ProQuest LISA databases. All the selected studies have been critically analysed and evaluated to present the true picture of ICT skills and competencies of LIS in the last six-year literature. General Inferences and reviews in this study effectively depict the key features of the publications in the previous six years and essential skills for LIS professionals, as well as challenges and strategies to overcome challenges. The study will emphasise how critical it is for



library personnel to develop their ICT abilities, skills, and authority to reduce or remove the challenges faced in training and infrastructure for practising ICT skills and competencies.

**Keywords:** ICT Skills and Competencies, LIS professionals, Challenges, Strategies, Trends

## 1. Introduction

The definition and role of libraries have changed drastically after the introduction of ICT in libraries. Traditional sources and e-resources are both important sources of information. With technological advancement and people becoming more technology-dependent, the need for librarians to adapt accordingly has also increased. ICT skills and competencies prepare LIS professionals to tackle technological advancement and provide appropriate services to their users. Any field of work requires its workers to be more knowledgeable and competent due to the introduction of ICT, and there is a pressing need for this as things have developed over time and with the introduction of new technologies. "Professionals are governed by codes of ethics, which state their dedication to competence, integrity, morality, altruism, and advancing the public good within their field of expertise. (Australian Council of Professions, 2003; Yadav A.K.S, 2021). Information specialists are under growing pressure to update their mechanical developments and techniques knowledge. As a result of these new advances, the calling is changing, with classic positions gradually being supplanted by new talents, career fields, and expectations. (Ashcroft, 2004; Idhalama et al., 2020). For librarians, the skills taught in institutions and the abilities needed to get employment are significantly different, and this skill gap needs to be filled. Many of these skill gaps are connected to Web 2.0 and ICT abilities. (Ajeemsha & Madhusudan, 2019). Raju (2014) and Vyas and Madhusudan (2021) emphasize that librarians need computer skills, metadata development and maintenance knowledge, digital material preservation, and digitization knowledge to function in online information settings. Skills and competencies required for the ICT professionals and various aspects of competencies" were the focus of Ajeemsha and Madhusudhan's (2012) study. They listed several abilities and skills necessary for ICT professionals, including "automation skills," "digital library competencies," "core and technological," "Web 2.0 abilities," "computer hardware abilities," "library management software abilities," "web page creations," "RFID," "e-journal, e-book, e-



resources," "knowledge management competencies virtual reference," "online metadata schema," "database creation," and "internet abilities.

### **Ways to Acquire New Skills and Competencies**

Enhancing ICT skills and competencies for library professionals can be achieved through various training programs, which include Online Courses, workshops by Library Associations, Certification Programs, Webinars and Online Workshops, Technical Training Institutes, Online Tutorials and Documentation, Collaborative Projects, Professional Networking, On-the-Job Learning, Conferences and Symposia, Education Program (CEP), Continuing Development Program (CDP).

### **Challenges in acquiring ICT skills and Competencies**

Acquiring ICT skills and competencies for library professionals can pose several challenges, including keeping up with rapidly evolving technology, overcoming resistance to change, accessing relevant training, managing time constraints, and ensuring equitable access to resources for all staff members. Additionally, the diverse range of ICT tools and platforms available can overwhelm choosing the most suitable ones for specific library needs.

### **New trends and emerging technologies in ICT Skills and Competencies**

Using AI for tasks like data analysis, personalized recommendations, and automating routine processes, machine learning algorithms to categorize and tag content, enhancing search capabilities, and predicting user preferences, using data analytics to gain insights into user behaviour, collection usage, Digital Preservation, exploring VR (virtual reality and AR technologies for creating immersive learning experiences, virtual tours, and interactive educational content, Blockchain technology for areas like copyright management, provenance verification, and secure document sharing within libraries, Cyber security tools and techniques for data are some of the emerging technologies.

### **Objectives of the Study**

- (i) To study the essential ICT skills and competencies LIS professionals require in this digital age to manage Library services.
- (ii) To study the need and effect of learning ICT skills and competencies
- (iii) To determine the impact of training, continuing education programs/continuing development programs in acquiring ICT skills and competencies.
- (iv) To find out the challenges professionals face in acquiring and practising ICT skills and competencies.
- (v) To study strategies to overcome challenges and acquire ICT skills and competencies by library professionals.
- (vi) To study trends and emerging technologies in ICT skills and competencies.

### **Methodology**

This review has been conducted using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines for the systematic review. Some previous systematic reviews following the PRISMA guidelines have been consulted to strategize the study. Following those studies, the methodology used in this study includes formulation of research questions, search strategy, synthesis of results, and analysis of risk of bias. Keywords for the search strategy have been selected from some highly cited articles in the chosen study area. Search strings were drawn, and inclusion and exclusion criteria were used to screen the retrieved documents.

### **Search Strategy**

A distinct search was conducted for each database, using search terms aligned with the specific objectives and employing Boolean search techniques. The literature was sourced from two databases: ProQuest LISA and Web of Science (WoS). The search string was entered into the advanced search fields (title, abstract, and topic) using Boolean operators and additional filters, which included publication years (2018-2023), document type (articles), source type (scholarly journals), and language (English).



The search string was constructed using Boolean operators as follows: "ICT skills" OR "ICT competencies" OR "Librarian skills and competencies" OR "ICT proficiency of LIS professionals" OR librarians OR librar\* NOT "school librarian" NOT "school libraries."

### **Inclusion Criteria**

- (i) Publications between 2018 and 2023.
- (ii) Document type restricted to articles.
- (iii) Studies addressing at least two research questions.
- (iv) Research focused on college, public, special, or university libraries.
- (v) Articles published in English only.

### **Exclusion Criteria:**

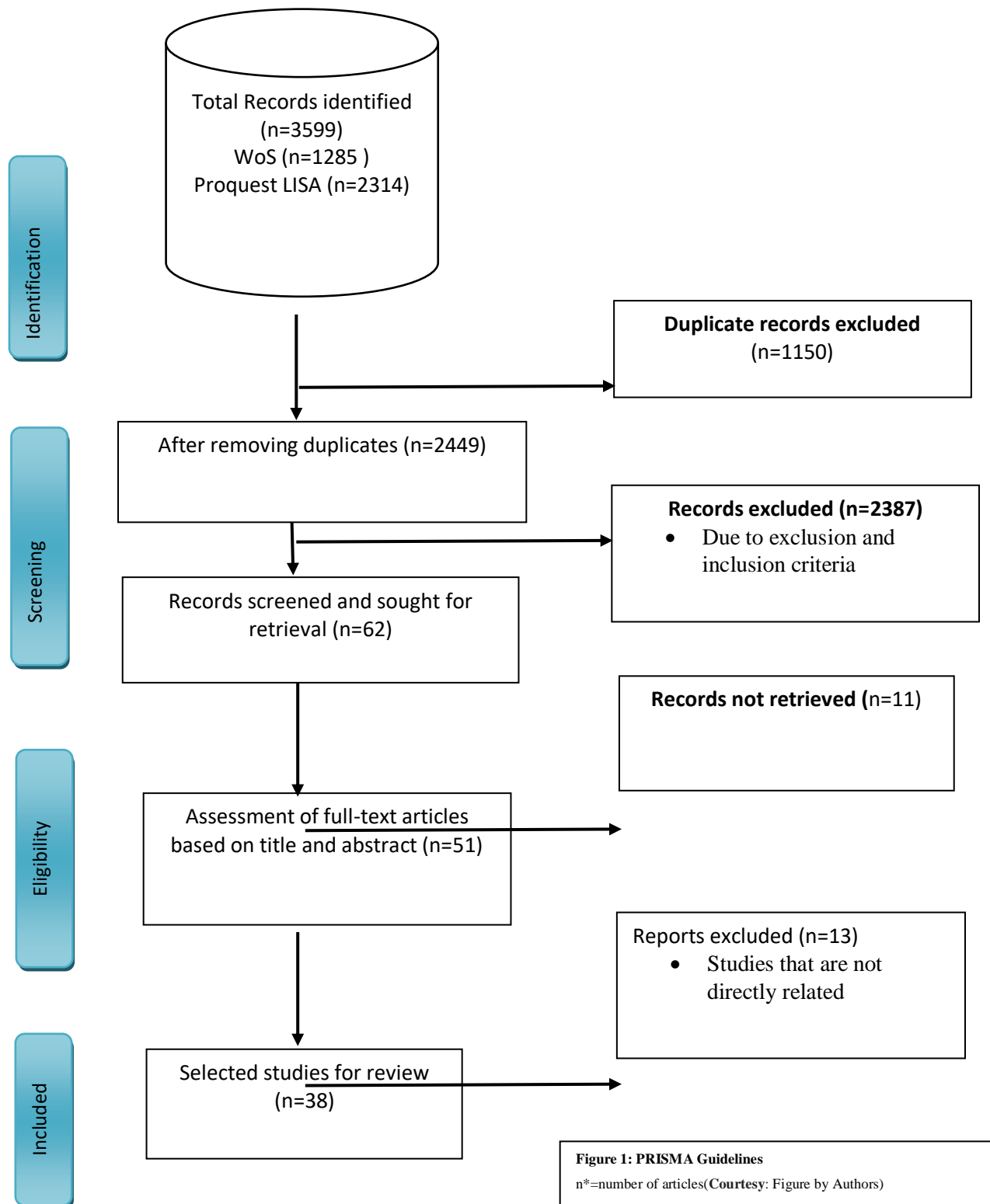
- (i) Non-English publications.
- (ii) Full-text articles not available.
- (iii) Studies addressing only a single research question.

### **Synthesis of Results**

We utilized MS Excel to present and synthesize the results using a thematic approach. This method involved systematically creating codes and descriptive themes. The findings from each study were extracted and recorded in MS Excel for this review. Subsequently, relevant themes were developed based on the completed process.

### **Risk of Bias**

Screening of records was conducted in stages. First, titles were reviewed to assess relevance, followed by an evaluation of abstracts to determine the reliability of the study's focus. Studies deemed relevant were included, while those not aligned with the research objectives were excluded.

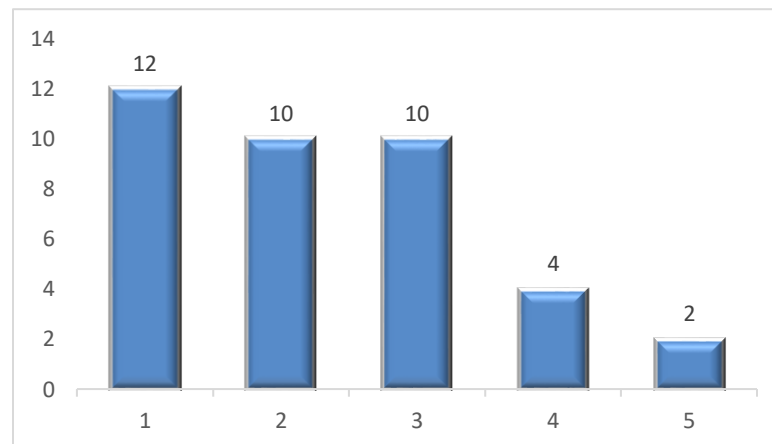


## General Inferences from the review articles

In this section, the authors have presented the general inferences from the selected articles for the review. These inferences are drawn using the bibliographic information of the selected articles. These may be bibliometric analyses for some readers, but the authors want to clarify that these inferences are simple analyses of some bibliographic details of selected articles. The authors do not apply any bibliometric laws and indicators in this analysis. The motive of these general inferences is to facilitate readers' awareness of the sources of the articles and key features of literature published in the selected review area in the last five years so that the true meaning of using PRISMA guidelines can be justified.

### 4.1 Number of Authors in Selected Studies

Figure 2 shows the authorship pattern in the articles selected for the review. It revealed that only one author has authored most articles, while some are by two or three authors. Four and five authors are also found to have contributed in some publications but relatively less than single and two authored publications. It can be predicted from the figure that authors are collaborating on

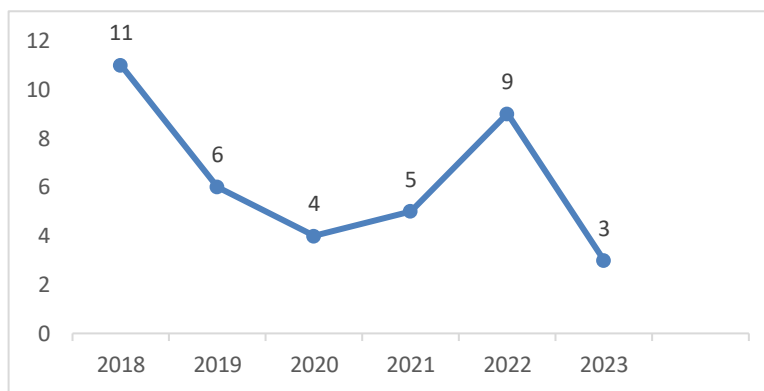


ICT skills and competencies for LIS professionals.

**Figure 2: Authorship pattern**

### Publication growth over the past six years

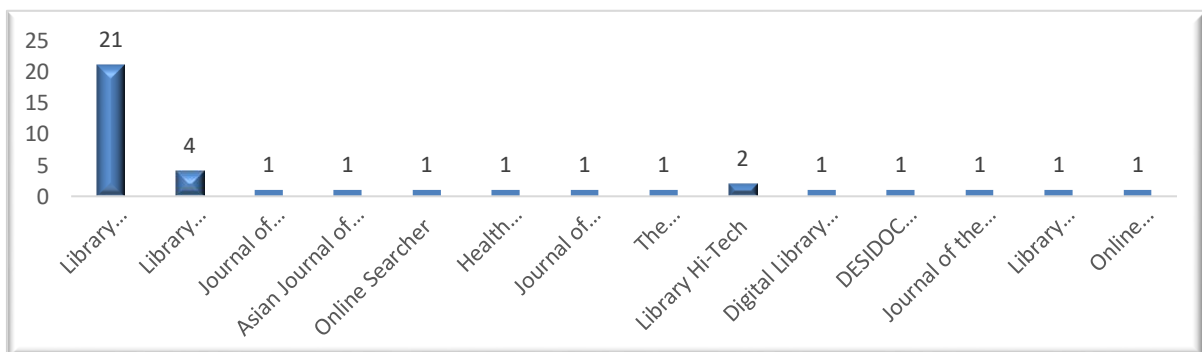
Figure 3 shows the publication growth in the last six years in the select review area. It can be seen that eleven articles were published in the year 2018, followed by six in the years 2019, four in 2020, five in 2021, while nine articles were published in 2022 and three articles in the year 2023. It is worth mentioning here that 2019 to 2021 were the years of the COVID-19 pandemic, and the number of articles published has increased since 2020. This trend may be because during and after the COVID-19 pandemic, professionals faced many challenges in delivering services to their patrons, and they found that ICT skills and competencies are necessary for catering to these emergency challenges.



**Figure 3: Growth of Publication**

### Journal Distribution of Selected Articles

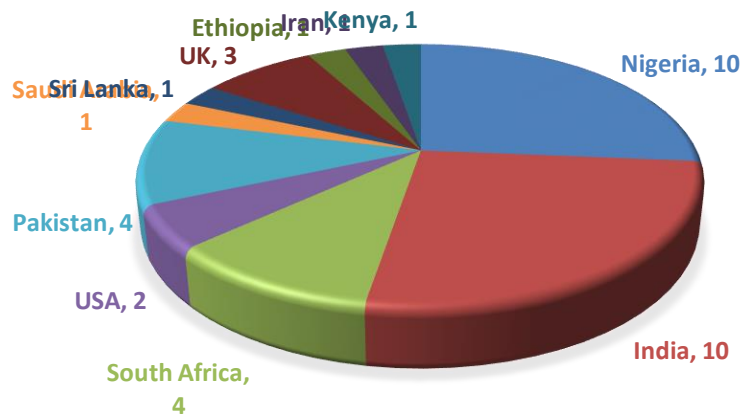
Figure 4 shows the distribution of articles in various journals. Library Philosophy and Practice has the maximum number of articles at 21, followed by Library Management (four) and Library Hi-Tech (two), which has four articles, while other journals have one.



**Figure 4: Distribution of Journals**

### Geographical distribution of selected articles by country

Figure 5 shows the “country-wise distribution” of articles selected for the review. While reviewing Figure 5, it is observed that ten articles were published in Nigeria, ten in India, four in South Africa and Pakistan respectively, and three in the UK. It can be predicted from the figure that most of the articles on ICT skills and competencies for LIS professionals in the last five

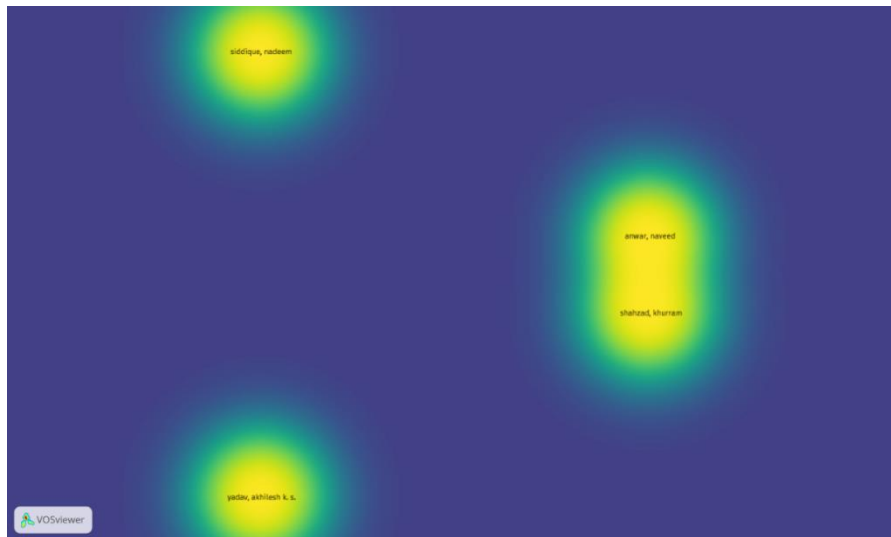


years have been published in developing countries, showing that professionals in developed countries have already mastered the ICT skills and competencies.

**Figure5: Geographical distribution of selected articles by country**

### Co-Authorship Pattern

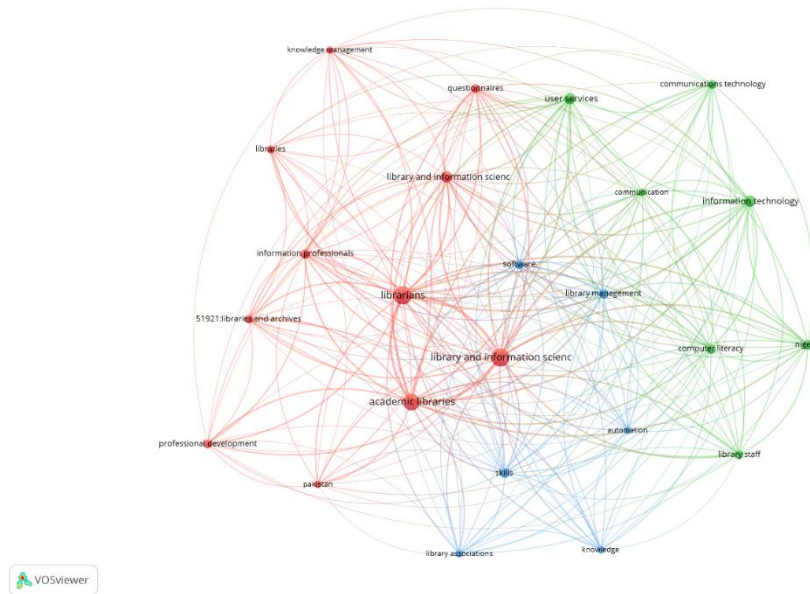
Figure 6 of the “co-authorship pattern” depicts the main authors working in ICT skills and competencies. The statistics show that Khurram, Shahzad Naveed, Anwar, Siddique, and Nadeem are the main authors working on their relatedness to each other. Other authors are working independently **in different areas of ICT skills and competencies.**



**Figure: 6 co-authorship patterns**

### **Keywords co-occurrence analysis in the Selected Articles**

Figure 6 shows the “keyword co-occurrence” analysis in the selected articles. Figure 5.6 shows a big distance between librarians and information technology, indicating little relatedness between these two, and librarians need to be proficient in IT skills. There is a lot to learn and evolve. The figure also shows the connection between IT, computer literacy, communication, and communication technology, which shows that learning information literacy and IT skills complement each other.



**Figure 7: Keyword occurrence analysis**

## Review of the selected articles

### Essential ICT skills and competencies for LIS professionals

The requisite professional proficiency of library staff can be categorized into three levels: very high level, intermediary level, and low-level. However, the advanced or intermediary skills needed for particular areas might feel low after some time due to habituating to technology. Some skills in ICT are become fundamental in any organization. In the library context, basic skills include word processing, PowerPoint presentation, emailing, scanning, or assisting with intermediary-level and high-level technological tasks. Intermediary skills are handling library-related tools and technology, serving on the front end, directly contacting users, and handling diverse software like ILS, IRS, LMS, collaborative tools, mobile-based applications, and many other emerging technologies. High-level, also known as advanced level proficiency, is required to design, develop, configure, and customize the library system according to the requirement. High-level skills are almost technical, and LIS professionals draw the library system services for security or effective and efficient services.

Proficiency in word processing, MS Word, MS PowerPoint, and MS Excel, email management, scanning, uploading, use of OPAC, handling social media platforms, E-references services, library security systems, integrated library management software, database management,



digitization, institutional repositories, statically analysis, cloud computing, discovery tools usage, Linux operating system, web technology, computer programming, networking, hyperlinking, knowledge taxonomy (Oyedokun *et al.*, 2018; Abbas & Siddique, 2019; Burton, 2019; Agave & Underwood, 2020). Emerging AI technologies such as blockchain, RFID, drones, expert systems, robotics, IoT, and others should focus on mobile-based and Metaverse-based library services.

### **Effect of CEP and CDP on LIS professionals**

The LIS profession is multidimensional and must always be up-to-date with current information, technology, user requirements, and perceptions. Besides formal academic degrees, they must join continuous educational programs (CEP) or professional development (CPD) programs. "They should focus on learning and enhancing their information literacy skills, though LISPs demonstrate their competency to "understand the availability" of information. However, they should be competent enough to identify various potential sources and keep up-to-date with these to search out information and formulate effective search strategies"(Ali & Ahmed, 2022). The ICT skills of library personnel influence digital preservation practices in the library (Akintonde & Awujoola, 2022). Haruna & Okafor (2022) state their findings that ICT skills help librarians in performances like checking duplication, enhancing job performance in acquisition, sending orders, monitoring, and downloading invoices from websites. The ICT skills and abilities in the library decrease the time consumed, increase efficiency, and save time and space.

There is a very close relationship between training on ICT and performing allocated tasks of employees in university libraries. ICT facilities and various training funded by authorities directly impact the level of job performance by staff (Abubakar & Saka, 2021). Librarians need many ICT skills at introductory, intermediate, and advanced levels. "LIS professionals were skilled in word processing, database, and internet/communication. Still, they needed to be more proficient in scholarly communication, including journal articles, technical papers, conference proceedings, chapters of books" (Amuchee *et al.*, 2020). Library Professionals prefer professional development to enhance their skills (Anwar *et al.*, 2021). Professional development activities must be essential for updating and upgrading their knowledge and skills and shaping their attitudes and values about service provision for beginners and future librarians (Cherinet, 2018). Most professionals



prefer to participate in conventional CPD programs, namely in-house training, workshops, seminars, conferences, professional meetings, personal practice, and LIS schools and departments to acquire ICT competencies. However, computer short courses and informal methods received little attention from the participants. Among distinguished CPD, conferences, seminars, and workshops were in most demand due to the easiest and simplest learning methods within a very short period (Abbas & Siddique, 2019; Agave & Underwood, 2020; Gunasekera, 2021). Professionals prefer on-the-job training over off-site training for various reasons, such as financial benefits to the company or libraries. However, they also advised encouraging off-site training because they bring fresh perspectives and ideas to the workplace (Izah, 2022).

### **Challenges to enhance ICT skills and competencies**

LIS professionals need continuous upgrades of their skills and knowledge to perform their allocated tasks excellently. For that purpose, numerous PDPs, such as conferences, seminars, and workshops, have been conducted locally and globally. However, due to several obstacles, LIS professionals need more reach in such programs and can develop the required skills and knowledge. Among those barriers, inadequate ICT infrastructure, lack of awareness, resistance to change, insufficient provision for staff training and development, technophobia, low bandwidth Internet, and lack of motivation are significant issues in acquiring ICT skills and competencies (Oyedokun et al., 2018; Chudasama et al., 2019; Ebonget et al., 2022). Technological advancement and the IT sector threaten professionals with traditional skills (Yadav, 2022). LIS staff must learn ICT skills and competencies to keep this field alive. Data security and privacy have been significant challenges in adopting ICT tools and technology in recent years, and LIS staff must have the skills to ensure library resources and services (Chudasama et al., 2019). Most refresher courses, workshops, and training centres offer a theoretical approach to teaching the ICT model rather than a practical one, another challenge for LIS professionals to enhance their proficiency (Agave & Underwood, 2020). Besides lack of financial and motivational support from library authorities, lack of individual interest, family problems, and unfeasible timing for training are some problems staff face in acquiring ICT skills (Anwar et al., 2021).



### **Strategies to enhance ICT skills and competencies**

Skilled and competent staff give the organization a name and fame. To develop staff skills, libraries need to have a policy for human resource development (HRD). Libraries are not-for-profit organizations; they must manage various things with limited budgets. Therefore, authorities should allocate separate or sufficient funding to conduct PDP, especially for in-service training and participation in conferences, seminars, short-term courses, and workshops. Authorities need to develop ICT infrastructure to adopt emerging technology. Libraries should initiate orientation and awareness programs for staff and users of newly implemented systems and emerging technologies available globally. Libraries have to be aware of LIS staff running PDP programs (Oydeokun, 2018; Sudhier & Seena, 2018; Angeline, 2019; Maniet al., 2019; Gunasekera, 2021; Akintonde & Awujoola, 2022). LIS schools need to incorporate emerging technology content in their curricula to produce skilled and competent ICT professionals required for all types of libraries and to meet the expectations of Generation Z users. They are merely acquiring new skills which need to be improved. It is essential to unlearn certain behaviours and practices for the success of individual librarians, libraries, and society (Cherinet, 2018).

Abban (2018) found that libraries recognize the need for proper training and developing ICT skills in their staff and encourage them to acquire skills like library marketing, management, library collection management, and website creation.

### **Emerging technologies and trends in ICT skills and competencies**

Cox (2021) discussed the hybrid logic of AI in libraries, conveying that in addition to the managerial logic of efficiency, responsibility, and customer focus, professional ideals of quality and services are also pursued. Some methods require resources other than staff time and expertise; for instance, third-party platform licensing is expensive, and access is contingent on having available funds. Therefore, the abundance of resources would influence decisions as well. Only time will tell, but talent and financial resources may be the vital internal elements influencing how a library responds to the opportunity or challenge given by AI. Attitude toward risk may also be important. Future librarians must implement their ICT skills and competencies in developing and managing open education resources (OER). It will require competencies in



intellectual property, improved search options, enhanced metadata, and engagement with technical systems and services (Anderson & Leachman, 2019).

## **Conclusion**

As technology advances, library workers need diverse skills to navigate digital resources, support users with their informational requirements, and actively participate in developing innovative informational solutions. The dynamic and ever-changing technological landscape challenges LIS professionals. These challenges encompass disparities in technology access, constraints in terms of time and finances, resistance to change, insufficient institutional support, libraries lacking essential infrastructure, gaps in digital literacy, and the intricacies of technical complexity. Experts must devise effective strategies for Continuous Development Programs (CDPs) and Continuous Education Programs (CEPs) tailored for library professionals. It is crucial for professionals to proactively seize opportunities post-seminars and workshops to enhance their ICT abilities and skills. Professionals can learn from one another and use collective expertise through networking, mentoring, and collaborative projects, as well as through continuous learning, taking online courses, actively participating in professional associations, attending workshops and seminars, and encouraging an experimental mindset. The motivation factor is a great power that influences the LIS staff to participate in PDP activities, which are possible through the initiation of library authorities as librarians. LIS school curricula are a foundation for early careers, must incorporate emerging technology content, and a practical approach should be adopted rather than theoretical. Applying practical sessions for the ICT module in in-service training, short-term courses, and workshops is urgent. Library staff must hide their inferiority complex to share their skills and knowledge with colleagues and professionals.

A significant limitation of this study was the small sample size, the choice of source databases, and the search strings and filters applied. The PRISMA guidelines were adhered to in screening the 38 selected papers. Despite these limitations, the study provides valuable insights into ICT skills, their impact on LIS professionals' responsibilities, and their challenges, offering potential solutions. For future research on LIS professionals' skills and competencies, exploring other methodological approaches and more databases/web sources are strongly recommended.



## References

- Abban, Samuel, "Training and Development of Library Staff: A Case of Two University Libraries in Ghana" (2018). *Library Philosophy and Practice* (e-journal), 1-18. <https://digitalcommons.unl.edu/libphilprac/1794/>.
- Abbas, M. A., & Siddique, N. (2020). A Study of ICT Competencies among University Library Professionals of Punjab, Pakistan. *Library Philosophy and Practice*, 1-26. <https://digitalcommons.unl.edu/libphilprac/4000/>.
- Abubakar, L., & Saka, K. A. (2021). Relationships among ICT training, skills acquisition, use and job performance of library personnel in universities in north-west Nigeria, *Library Philosophy and Practice*, 1-23. <https://digitalcommons.unl.edu/libphilprac/4917/>.
- Abukhader, S. (2019). A taxonomy of the expected roles of librarians towards knowledge management: An eight-layer perspective for practice: Expected roles of librarians towards KM, *Library Management*, 40(1), 34-44.
- Agava, S. L., & Underwood, P. G. (2020). ICT proficiency: Perspectives of Tangaza University College librarians in Kenya. *Library Management*, 41(6), 487–501.
- Aiyebilehin, J. A. (2018). Factors Affecting Implementation of Emerging Information Communication Technology Skills in Libraries in Sub-Saharan Africa: Survey of Carnegie CPD Fellows. *The International Information & Library Review*, 50(4), 291-300.
- Akintonde, A. A., & Awujoola, O. A. (2022). Information and communication technology skills and digital preservation process by library personnel in some selected university libraries in South–West Nigeria. *Library Philosophy and Practice*, 1-17. <https://digitalcommons.unl.edu/libphilprac/7358/>.
- Ali, S. & Ahmed, S. (2021). Information Literacy Skills among Library and Information Science Professionals: a forecaster of Research Support Services. *Library Hi Tech*. 40(6).1689-1704.
- Amuche, A. E., Ngwuchukwa, M. N., Ihekwoaba, E. C. & Okwor, R. N. (2020). Influence of ICT literacy skills on research publication of librarians in federal universities in southeast Nigeria. *Library Philosophy and Practice*, 1-19. <https://digitalcommons.unl.edu/libphilprac/4379/>.



Anderson, T., & Leachman, C. (2019). Strategies for supporting OER adoption through faculty and instructor use of a federated search tool. *Journal of Librarianship and Scholarly Communication*, 7 (1), 1–13. <https://doi.org/10.7710/2162-3309.2279>.

Angeline, X. M. (2019). Skills of using Internet and computer communication networks among library professionals working in selected arts and science colleges affiliated by Bharathidhasan University. *Library Philosophy and Practice*, 1-16. <https://digitalcommons.unl.edu/libphilprac/2265/>.

Ansari, Masoumeh; Shahdadnezhad, Elham; Khalidian, Mehrdad; and Poorsani, Maryam, "The Role Of Social Networks In The Scientific Exchange Of Librarians: A Case Study" (2018). *Library Philosophy and Practice* (e-journal). 1837.

Anwar, N., Shahzad, K., & Tariq, M. (2021). Need and Effectiveness of Professional Development Courses for Academic Librarians of Capital City of Punjab, Pakistan. *Library Philosophy and Practice*, 1–20. <https://digitalcommons.unl.edu/libphilprac/5735/>.

Anwar, N., Shahzad, K., Tariq, M., & Bhatti, A. M. (2021). Barriers for the Adoption of Professional Development Courses (PDCs) in Public Sector University Libraries. *Library Philosophy and Practice*, 1–26. <https://digitalcommons.unl.edu/libphilprac/6389/>.

Burton, S. (2019). Future Skills for the LIS Profession. *Online Searcher*, 43(2), 42–45.

Carlyle, R., Thain, A. & James, S. (2022). Developing and spreading health literacy eLearning: A partnership across Scotland and England. *Health information and libraries journal*. 39(3). 299-303.

Cherinet, Y. M. (2018). Blended skills and future roles of librarians. *Library Management*, 39(1), 93–105.

Chiwere, E. R. T. (2020). Data librarianship in South African academic and research libraries: a survey: Data librarianship in South African libraries. *Library Management*, 41(6), 401-416.

Chudasma, P., Bhatt, A., & Trivedi, D. (2019). Application of cloud computing in university libraries: A case study of selected university libraries in Gujarat. *Library Philosophy and Practice*, 1–23. <https://digitalcommons.unl.edu/libphilprac/2744/>.

Chukwueke, C., & Idris, I. H. (2023). Librarians' digital literacy skills and services delivery in academic libraries in Taraba state, Nigeria: A correlation. *Library Philosophy and Practice*, 1-14. <https://digitalcommons.unl.edu/libphilprac/7565/>.



Cox, A. (2023). How artificial intelligence might change academic library work: Applying the competencies literature and the theory of the professions. *Journal of the Association for Information Science and Technology*, 74(3), 367–380.

Daniels, G. N., Wiche, H. I., & Nsirim, O. (2023). Librarians' ICT skills and effective library service delivery in university libraries in Rivers State. *Library Philosophy and Practice*, 1-22. <https://digitalcommons.unl.edu/libphilprac/7501/>.

Ebong, M., Ogwo, U., & Nwachukwu, V. N. (2022). Continuing professional development as a medium in the empowerment of library and information science educators for effective knowledge delivery and sustainable education in southeast Nigeria. *Library Philosophy and Practice*, 1-21. <https://digitalcommons.unl.edu/libphilprac/7086/>.

Elayadom, S.C. & Thirunavukkarasu, A. (2018). Essential Skills and Expertise Needed for LIS Professionals to Participate Effectively in Knowledge Management Practices. *Asian Journal of Information Science and Technology*. 8 (3).82-8.

Gunasekera, C. (2021). Continuing Professional Development for Library Professionals in Sri Lanka: University Libraries Perspectives. *Library Philosophy and Practice*, 1-21. <https://digitalcommons.unl.edu/libphilprac/5036/>.

Haruna, A., & Josephine, O. C. (2022). Influence of information and communication technology (ICT) use on staff job performance in Benue state, Nigeria university libraries. *Library Philosophy and Practice*, 1–18. <https://digitalcommons.unl.edu/libphilprac/7264/>.

Hashimian M., Zare- Farashbandi, F. Yamani, N., Rahimi A., & Adibi, P. (2021). A core competency model for clinical Informationists. *Journal of the Medical Library Association*. 109(1). 33-43.

Izah, M. (2022). Assessment of training and development of library staff in federal university libraries in Nigeria. *Library Leadership & Management*, 36(1), 1–17.

Jeyshankar, R., & Vellaichamy, A. (2018). An analysis of women faculty attitudes, perceptions and experiences of information access competency. *Library Philosophy and Practice*, 1-34. <https://digitalcommons.unl.edu/libphilprac/1860/>.



Joo, S., Choi, N., & Baek, T. H. (2018). Library marketing via social media: The relationships between Facebook content and user engagement in public libraries: Library marketing via social media. *Online Information Review*, 42(6), 940–955.

Mani, M., Thirumagal, A., & Priyadharshini, E. (2019). ICT skills among technical institute library professionals at Tirunelveli district, Tamil Nadu: a study. *Library Philosophy and Practice*, 1-11. <https://digitalcommons.unl.edu/libphilprac/2315/>.

Naveed, M. A., Siddique, N., Mahmood, K. (2022). Development and validation Of core technology competencies for systems librarian. *Digital Library Perspectives*. 38 (2).189-204

Oyedokun, T. T., Oyewumi, F. A., Akanbi, M. L., & Laaro, D. M. (2018). Assessment of ICT competencies of library staff in selected universities in Kwara state, Nigeria. *Library Philosophy and Practice*, 1. <https://digitalcommons.unl.edu/libphilprac/1797/>.

Rao, A. K., Rao, M. & Bhat S. K. (2018). Perception of Semi-Professionals in using ICT in Manipal Academy of Higher Education Libraries. *DESIDOC Journal of Library & Information Technology*. 38(5).

Sudhier, K. G., & Seena, S. T. (2018). Library Professionals' Adoption of Cloud Computing Technologies: A Case Study on Kerala University Library, India. *Library Philosophy and Practice*, 1. <https://digitalcommons.unl.edu/libphilprac/1832/>.

Tella, A., Akande, T. O., & Bamidele, S. S. (2018). ICT knowledge and skills required for recruitment of academic librarians in the digital age. *Library Philosophy and Practice*, 1-12.

Yadav, A. K. S. (2022). Key skills and competencies of LIS professionals in the digital library environment: a content analysis of job advertisements. *Library Management*, 43(1), 50-65.

Yadav, A.K.S. (2022). The essential skills and competencies of LIS professionals in the digital age: Alumni perspectives survey. *Global Knowledge, Memory and Communication*. 71(8/9). 837-856.