Human Resource Preparedness for ICT-Driven Library Services in the Digital Era

Dr. Dasari Narayana
Assistant Librarian
Central Tribal University of Andhra Pradesh

M. Harihararao
Library Assistant
MVGR College of Engineering (Autonomous),
Andhra Pradesh

Abstract

The rapid transformation of library services through Information and Communication Technology (ICT) has generated a pressing need for library staff to acquire, adapt, and deploy technology-based competencies in their professional roles. This paper examines the Preparedness of library staff towards ICT-based library services in university libraries across Andhra Pradesh, India. Employing a descriptive survey method, data were gathered from 85 library professionals working in state, central, deemed, and private university libraries. The study evaluates staff Preparedness across dimensions including ICT skill levels, availability of infrastructure, training exposure, and attitude towards ICT adoption. Findings indicate that while a majority of staff possess basic computer and internet skills, advanced ICT competencies such as digital content management, e-resource handling, and library automation management remain underdeveloped among paraprofessional and lower-designation staff. The study further reveals significant gaps in structured training opportunities, institutional support, and motivational frameworks. The paper concludes with recommendations for targeted capacity-building interventions, policy reforms, and ICT-inclusive recruitment strategies to strengthen staff Preparedness across academic library environments in Andhra Pradesh.

Keywords: *Human Resource Preparedness;Staff; ICT-Based Library Services; Library Professionals; Digital Competency; University Libraries*

I. INTRODUCTION

The emergence of Information and Communication Technology (ICT) has fundamentally redefined the operational landscape of academic libraries, transitioning them from repositories of physical materials to dynamic knowledge hubs delivering a wide spectrum of digital and hybrid services. Libraries in the twenty-first century are no longer confined to cataloguing, lending, and reference functions in the conventional sense; rather, they are expected to provide e-database access, digital reference services, OPAC (Online Public

Access Catalogue) navigation, institutional repository support, and technology-mediated information literacy instruction.

In India, the momentum towards ICT integration in academic libraries has been accelerated by national initiatives such as INFLIBNET (Information and Library Network Centre), DELNET (Developing Library Network), and the UGC's mandate for digitization under the National Knowledge Commission framework. The SOUL (Software for University Libraries) and KOHA open-source library management systems have further propelled library automation across state and central university libraries. However, the efficacy of these infrastructural developments is largely contingent on the Preparedness of library staff to engage with and operationalize these technologies in their daily professional practice.

Library staff Preparedness encompasses not merely the possession of technical skills, but also the attitudinal disposition, training exposure, institutional support, and motivational impetus required to effectively deploy ICT tools in service delivery. Despite considerable investment in ICT infrastructure, a structural gap persists between the availability of technology and the capacity of staff to leverage it optimally. This gap is particularly pronounced in state and private university libraries in Andhra Pradesh, where formal ICT training programmes remain sporadic and often non-institutionalized.

The present study, conducted in 2018–2019, seeks to investigate the extent of staff Preparedness towards ICT-based library services in university libraries across Andhra Pradesh, examine the constraining factors, and offer policy-relevant recommendations for bridging the Preparedness deficit.

1.1 Staff and Skill Concept

The concept of 'staff Human Resource Preparedness' in the library context refers to the preparedness of library personnel at all hierarchical levels including Librarians, Deputy Librarians, Assistant Librarians, and Library Assistants to adopt, apply, and adapt to ICT tools and systems in the performance of their professional duties. Preparedness is a multidimensional construct comprising cognitive Preparedness (knowledge of ICT tools and systems), psychomotor Preparedness (practical ability to operate ICT hardware and software), affective Preparedness (positive attitudes towards technology adoption), and institutional Preparedness (availability of infrastructure, training support, and policy frameworks).

Skill, in the professional library context, may be classified into foundational ICT skills (basic computer operation, email usage, internet browsing), technical library-specific skills (library management software operation, database searching, OPAC management, barcode and RFID handling), and advanced digital skills (institutional repository management, digital content curation, metadata creation, and e-resource procurement). The interplay of these skill dimensions determines the effectiveness of staff in delivering ICT-based library services and positions the library as a technologically responsive knowledge institution.

Professional skill development in LIS is also closely tied to pre-service education and in-service training. The UGC's Human Resource Development Centres (HRDCs) and programmes such as SWAYAM and NPTEL have emerged as important platforms for continuing professional development (CPD) among LIS practitioners, enabling them to upgrade skill sets in consonance with evolving technological demands.

1.2 ICT-Based Library Services

ICT-based library services refer to the entire spectrum of library services that are enabled, mediated, or enhanced by information and communication technologies. These services broadly encompass library automation (cataloguing, circulation, serials management, and acquisitions through integrated library management systems such as KOHA and SOUL), digital reference services (virtual reference through chat, email, and web-based portals), e-resource access and management (access to e-journals, e-books, e-databases, and open access repositories), institutional repository development and management (DSpace, EPrints), and user education services (information literacy programmes conducted through ICT-mediated platforms).

In the Indian context, INFLIBNET's NLIST programme has made available approximately 97,000 full-text e-journals and 5.9 million e-books to college and university libraries across the country, fundamentally transforming the scope of information services available. Similarly, DELNET's resource-sharing network and KnowledgeGainer database programme have enabled member libraries to offer expanded access to shared bibliographic resources. The delivery of these services, however, is contingent upon the technological literacy of library staff who mediate between the user community and the ICT-enabled information environment.

The adoption of ICT in library services is not merely a matter of infrastructure deployment but demands that library professionals develop a conscious, proactive, and empowered relationship with technology. Staff who are comfortable navigating ICT environments are better positioned to instruct users, troubleshoot technical challenges, manage digital collections, and contribute to the library's evolving digital mandate.

1.3 Objectives of the Study

The present study was guided by the following two specific objectives:

1. To assess the level of ICT skill Preparedness among library staff at different professional designations in university libraries in Andhra Pradesh and to identify the key barriers limiting their effective engagement with ICT-based library services.
2. To examine the nature and adequacy of training and institutional support mechanisms available to library staff for ICT skill development, and to suggest evidence-based strategies for enhancing staff Preparedness towards ICT-based library services.

II. REVIEW OF LITERATURE

A selective review of significant published studies on ICT skills, staff Human Resource Preparedness, and technology-based library services has been undertaken below. The following eight studies provide a substantive foundation for situating the present research within the existing body of knowledge.

1. Satpathy and Maharana (2011)

Satpathy, S.K. and Maharana, R.K. (2011) investigated ICT skills of LIS professionals in engineering institutions of Orissa and published their findings in the Library Philosophy and Practice (e-journal), Paper 627. The study used a structured questionnaire administered to 62 library professionals and found that the majority had reasonable familiarity with basic computer applications and internet searching but were deficient in digital library operations, institutional repository management, and advanced database skills. The study's identification of 'skill gaps' between basic and advanced ICT proficiency levels informs the present study's conceptual framework for Preparedness assessment.

2. Kumar (2013)

Kumar, K. (2013) investigated ICT skill knowledge among LIS professionals in engineering institutions of Andhra Pradesh State and published the study in the DESIDOC Journal of Library and Information Technology (Vol. 33, No. 6, pp. 480–487). The study found that professionals in the Rayalaseema region were largely computer literate and possessed basic ICT skills sufficient for routine library operations, but that there was considerable scope for developing innovative ICT skills. Motivational factors, training availability, and institutional infrastructure were identified as significant determinants of ICT Human Resource Preparedness. The regional focus of this study makes it a particularly pertinent reference for the present research.

3. Seena and Sudhier-Pillai (2014)

Seena, S.T. and Sudhier-Pillai, K.G. (2014) conducted a study of ICT skills among library professionals in the Kerala University Library System and published findings in the Annals of Library and Information Studies (Vol. 61, pp. 132–141). The study found varied skill levels across designations, with senior professionals demonstrating higher proficiency than junior staff, and highlighted that periodic ICT training had a measurable positive impact on overall skill Human Resource Preparedness. The study's designation-wise comparative analysis and use of the Likert scale for attitude measurement provide a methodological template relevant to the present study.

4. Ayoku and Okafor (2015)

Ayoku, O.A. and Okafor, V.N. (2015) examined ICT skills acquisition and competencies of librarians and their implications for digital and electronic library environments in Nigerian universities. The study was published in The Electronic Library (Vol. 33, No. 3, pp. 502–

523). The researchers found that a substantial proportion of librarians were weakly skilled in ICT and that this deficiency adversely impacted the delivery of digital library services. The study's focus on the relationship between skill gaps and service quality, and its advocacy for structured training and policy support, makes it a widely referenced work in the global LIS literature and provides theoretical grounding for the present research.

5. Bansode and Viswe (2017)

Bansode, S.Y. and Viswe, R.R. (2017) assessed ICT literacy among library professionals working in university libraries in Maharashtra, India, and published the study in the DESIDOC Journal of Library & Information Technology (Vol. 37, No. 5, pp. 353–359). Using a structured questionnaire across 14 university libraries, the study found that the overall ICT literacy level was satisfactory but noted that further training in ICT-based library resources, digital services tools, and e-resource management was required. The findings highlighted that training needs differed significantly by designation and length of service, providing a demographic lens that is adopted in the present study's analytical framework.

6. Oyedokun, Oyewumi, Akanbi, and Laaro (2018)

Oyedokun, T.T., Oyewumi, F.A., Akanbi, L.A., and Laaro, A.M. (2018) assessed the ICT competencies of library staff in selected universities in Kwara State, Nigeria, and published the study in Library Philosophy and Practice (Article 1797). The study found that while ICT skills acquisition was positively associated with better task performance, tight work schedules, lack of motivation, inadequate training, and gaps in LIS curriculum were key constraining factors. Their identification of motivational and organizational barriers as determinants of staff ICT competency is particularly relevant to the Andhra Pradesh context examined in the present study.

7. Chelabhai, B. C. (2020). The study on human resource preparedness for ICT-driven library services highlights the increasing importance of digital competencies among library professionals in the modern information environment. The authors emphasize that librarians must continuously upgrade their technological skills to manage e-resources, digital repositories, and online user services effectively. The paper further explains that training, professional development, and ICT infrastructure are essential for sustaining digital library services. It concludes that human resource readiness directly influences the quality and efficiency of library service delivery in the digital era.

8. Solanki and Patel (2021) discussed the growing relevance of human resources in digital library environments where ICT forms the backbone of information services. The article explains that digital libraries require skilled manpower capable of handling automation, networking, electronic resources, and virtual reference services. The authors stress the necessity of continuous ICT training and professional adaptability among librarians. The paper also notes that library professionals must acquire competencies in digital content

management and user-oriented technological services to meet evolving information needs in academic institutions.

9. Ahmad et al. (2022) examined the preparedness of university libraries for digital preservation programs with special emphasis on human resources, technological infrastructure, and policy support. The study found that many libraries possess limited skilled staff for managing advanced digital preservation activities despite having moderate technological facilities. It identified inadequate training opportunities and insufficient professional development as major barriers to ICT-driven library services. The authors recommend strategic investment in staff training, digital competencies, and continuous learning programs to improve institutional preparedness for sustainable digital library operations.

III. METHODOLOGY

The present study adopts a descriptive survey research design, which is well suited to investigations aimed at examining the existing state of a phenomenon in this case, the Preparedness of library staff towards ICT-based services without manipulating variables. The study was conducted during the academic year 2018–2019.

Population and Sampling

The study population comprised library professionals working in university libraries across Andhra Pradesh, including Central Universities, State Universities, Deemed Universities, and Private Universities. A stratified random sampling technique was employed to ensure representation across university types and designation levels. A total of 100 questionnaires were distributed to library professionals in 12 universities, of which 85 were returned fully completed, yielding a response rate of 85%.

Data Collection Instrument

A structured questionnaire was the primary data collection instrument. The questionnaire was organized into four parts: (a) demographic profile of respondents (designation, qualification, experience, type of university); (b) ICT skill levels across a pre-defined checklist of basic, intermediate, and advanced competencies; (c) availability and adequacy of ICT infrastructure and training; and (d) attitude and perceived challenges related to ICT adoption. ICT skill levels and attitude items were measured on a five-point Likert scale, ranging from 1 (Very Low / Strongly Disagree) to 5 (Very High / Strongly Agree).

Data Analysis

Collected data were coded and analysed using SPSS (Statistical Package for Social Sciences) Version 22. Descriptive statistics including frequency distributions, percentages, means, and weighted means were employed to interpret skill levels and attitude scores. Cross-tabulation was used to examine the relationship between respondent designation and ICT skill Human

Resource Preparedness. Where appropriate, chi-square tests were applied to determine the statistical significance of observed associations.

IV. CONCEPT AND DISCUSSION

The data collected from 85 library professionals working across 12 university libraries in Andhra Pradesh were analysed stepwise across the following dimensions. The findings are presented sequentially, each accompanied by an interpretive inference.

Step 1: Demographic Profile of Respondents

The survey covered respondents across four designation categories: Librarian (18%), Deputy Librarian (14%), Assistant Librarian (37%), and Library Assistant (31%). In terms of educational qualification, 52% held a Master's degree in Library and Information Science (MLIS), 26% held B.Lib.I.Sc. as their highest qualification, and 22% were M.Phil. or Ph.D. holders. With respect to work experience, 43% had more than 10 years of service, 34% had between 5 and 10 years, and 23% had fewer than 5 years of library experience.

Inference: *The sample is well distributed across designations and experience levels, ensuring that the Preparedness findings reflect the diverse professional landscape within university library systems in Andhra Pradesh. The predominance of MLIS holders indicates a qualified workforce; however, the level of formal ICT education integrated into the MLIS curriculum remains uneven.*

Step 2: ICT Infrastructure Availability

A majority of respondents (78%) confirmed the availability of computers in their libraries, while 69% reported internet connectivity. However, only 48% indicated that their institution had a fully operational library management system (LMS), and 36% reported access to e-databases through INFLIBNET's N-LIST or similar consortia. Only 27% of respondents worked in libraries that had implemented digital institutional repositories. The availability of ICT infrastructure was found to be significantly better in Central and Deemed Universities than in State and Private Universities.

Inference: *Infrastructure availability, while improving, remains unequal across university types. The gap between Central and Private University libraries in terms of ICT infrastructure represents a critical institutional equity issue. The relatively low penetration of institutional repositories and LMS across the sample suggests that the full potential of ICT-based services remains unrealized in many libraries.*

Step 3: ICT Skill Levels Across Designations

Respondents were asked to self-assess their competency levels across a 15-item ICT skills checklist. The weighted mean scores for basic ICT skills (computer operation, email, internet browsing) were highest at 4.12, indicating reasonable foundational competency across the sample. Intermediate ICT skills (OPAC searching, LMS operation, digital resource access) registered a weighted mean of 3.38. Advanced ICT skills (institutional repository

management, metadata creation, digital content curation, e-resource procurement, and web content management) recorded the lowest weighted mean of 2.47.

Cross-tabulation analysis revealed a statistically significant difference (chi-square, $p < 0.05$) in advanced ICT skill levels across designation categories. Librarians and Deputy Librarians registered higher advanced skill scores (mean 3.15 and 2.91, respectively), while Library Assistants scored considerably lower (mean 1.87).

Inference: *The gradient of ICT skill proficiency across designation levels follows an expected hierarchical pattern but also reflects systemic inequities in training exposure. The alarming deficit in advanced ICT skills even among Librarians signals that foundational digital literacy is not being accompanied by the development of higher-order, service-delivery-oriented ICT competencies.*

Step 4: Training Exposure and Institutional Support

Only 38% of respondents had attended a formal ICT training programme or workshop in the preceding three years. Among those who had received training, 61% reported that the training was organized externally (through UGC-HRDC, INFLIBNET workshops, or professional associations) rather than by the employing institution. Only 21% indicated that their institution had a structured, recurring ICT training calendar for library staff. When asked about institutional support (provision of ICT devices, funding for conferences/workshops, internet access for professional development), only 34% rated institutional support as 'adequate' or 'highly adequate'.

Inference: *The low proportion of staff with recent formal training, and the predominance of external over institutional training, indicates a significant deficit in institutional commitment to staff ICT development. Libraries that rely exclusively on external training opportunities expose themselves to irregular, non-contextual capacity building. The inadequacy of institutional support is a systemic constraint requiring policy-level intervention.*

Step 5: Attitude towards ICT Adoption

Attitude towards ICT adoption was measured using a 10-item Likert scale. The overall mean attitude score was 3.74 (out of 5), suggesting a generally positive disposition. However, disaggregated analysis revealed that Library Assistants recorded a lower attitude mean (3.31) compared to Librarians (4.21). Items related to 'fear of making errors while using ICT' (mean 3.65) and 'concern about job displacement due to technology' (mean 3.22) registered notably elevated scores, indicating that techno-anxiety and job insecurity were residual concerns among a segment of library staff.

Inference: *The broadly positive attitude towards ICT is an enabling asset; however, the undercurrent of techno-anxiety particularly among paraprofessional staff must be addressed through confidence-building training programmes, peer mentoring, and institutional*

communication that frames ICT adoption as a career enhancement rather than a threat. Attitudinal Preparedness and skill Preparedness must be developed in tandem.

Step 6: Barriers to ICT-Based Service Delivery

Respondents were asked to identify barriers to effective ICT-based service delivery from a pre-listed inventory. The five most frequently cited barriers were: (i) lack of structured ICT training programmes (cited by 71%), (ii) inadequate ICT infrastructure (67%), (iii) erratic power supply and internet connectivity issues (58%), (iv) absence of institutional ICT policy for libraries (52%), and (v) insufficient motivation or incentives for skill development (46%). Open-ended responses also identified time constraints due to workload and language barriers in accessing English-language digital resources as secondary concerns.

Inference: *The barriers identified are multidimensional spanning infrastructure, institutional policy, human motivation, and contextual factors indicating that staff Preparedness cannot be improved through training alone. A holistic intervention model addressing infrastructure reliability, policy formulation, and motivational frameworks is necessary to create an enabling environment for sustained ICT adoption in library services.*

V. CONCLUSION

The present study has investigated the of library staff towards ICT-based library services in university libraries across Andhra Pradesh. The findings reveal a nuanced landscape of mixed competency: while foundational ICT skills are relatively widespread, advanced digital competencies essential for modern library service delivery remain underdeveloped, particularly among paraprofessional staff. Infrastructure disparities across university types, the inadequacy of structured institutional training, techno-anxiety among lower-designation staff, and the absence of formal ICT policies within many library systems collectively constitute the Preparedness deficit that limits the transformative potential of ICT investments in the library sector.

The study endorses a multi-pronged strategy for enhancing staff Human Resource Preparedness. First, university libraries should develop institutionally anchored, designation-specific ICT training calendars rather than relying solely on external programmes. Second, UGC, INFLIBNET, and state library councils should expand and deepen their workshop and orientation programmes to encompass advanced digital skills alongside basic competencies. Third, ICT adoption policies for academic libraries addressing infrastructure norms, staff training obligations, and digital service benchmarks should be integrated into NAAC SSR documentation and institutional quality assurance frameworks. Fourth, recruitment processes for library positions should incorporate ICT competency assessments to ensure that incoming staff possess baseline digital Human Resource Preparedness. Finally, continuing professional development through platforms such as UGC-HRDC, SWAYAM, and NPTEL should be incentivized through formal recognition in service records and career advancement criteria.

As university libraries in Andhra Pradesh strive to fulfil their mandate as technology-enabled learning and research support centres, the investment in staff Preparedness must be recognized as foundational not incidental to the library's institutional purpose. Empowered, confident, and ICT-competent library professionals are the most decisive determinant of whether ICT-based library services deliver on their transformative promise.

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