



Assessment of ICT Skills among Library Professionals: Developing a Theoretical Framework for Understanding Digital Literacy and Technology Adoption

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Abstract

Information and Communication Technology (ICT) has revolutionized the functioning of libraries worldwide, transforming traditional library services into digital and technology-driven information systems. In higher educational institutions, library professionals are expected to possess advanced ICT competencies to manage digital resources, automate library operations, facilitate online information access, and support teaching, learning, and research activities. The assessment of ICT skills among library professionals has become essential to understand their readiness to meet the demands of the digital information environment. This article examines the significance of ICT skills in academic libraries, explores key ICT competencies required by library professionals, discusses methods of assessing these skills, and highlights challenges and strategies for enhancing ICT proficiency among library staff in higher educational institutions.

Keywords: ICT Skills, Library Professionals, Academic Libraries, Higher Education, Digital Libraries, Library Automation, Information Technology.

Introduction

The rapid advancement of Information and Communication Technology (ICT) has significantly influenced the management and delivery of library services. Academic libraries, particularly those in higher educational institutions, have undergone substantial transformation from traditional print-based repositories to digital information centers. Library professionals are no longer confined to cataloging books and managing circulation services; they are now expected to handle integrated library management systems, digital repositories, online databases, institutional repositories, and various web-based services.

In this digital era, ICT competence has become a fundamental requirement for library professionals. Effective utilization of ICT tools enhances the efficiency of information



retrieval, resource sharing, user services, and knowledge dissemination. Consequently, assessing ICT skills among library professionals is crucial for identifying competency levels, training needs, and areas requiring improvement.

This article explores the importance of ICT skills in academic libraries, identifies key competencies required by library professionals, examines assessment approaches, and provides recommendations for strengthening ICT capabilities in higher educational institutions.

Research Background

The rapid advancement of Information and Communication Technology (ICT) has significantly transformed the higher education sector, influencing teaching, learning, research, and administrative functions. In today's digital era, educational institutions increasingly rely on technological tools and platforms to enhance instructional effectiveness, support research activities, and promote collaborative learning environments. Faculty members play a pivotal role in this transformation, as they are expected to possess not only fundamental ICT skills but also advanced technological competencies to effectively integrate digital tools into their professional practices.

The application of ICT in higher education encompasses a wide range of activities, including virtual teaching and learning, online assessment, digital content development, research data management, and participation in collaborative academic networks. These technological innovations have expanded access to information, improved communication, and created new opportunities for interactive and learner-centered education. Despite these benefits, variations in ICT utilization and competency levels among faculty members remain evident. Factors such as availability of technological infrastructure, access to training opportunities, institutional support, and individual attitudes toward technology often influence the extent of ICT adoption.

Therefore, examining the patterns of ICT usage, evaluating faculty members' competency levels, and identifying the challenges associated with technology integration are essential for promoting effective digital transformation in higher education. Such an assessment can provide valuable insights for policymakers and institutional administrators in developing strategies to strengthen ICT capabilities, enhance teaching and research outcomes,



and ensure the continued relevance and competitiveness of academic institutions in an increasingly technology-driven world.

Charles et al. (2022) obtained data using a standardized questionnaire disseminated across numerous management institutions, encompassing teaching personnel and postgraduate management students. The findings reveal knowledge of e-resources in general with specific attention on the online journals, e-books, e-databases and educational portals of management studies. Respondents mentioned using e-resources routinely for research projects, classroom instruction, assignment preparation, thesis writing and keeping themselves abreast of current advancements in the business. The most accessed platforms were Google Scholar, INFLIBNET, Emerald and Springer. Faculty personnel showed slightly more use of digital information than students, because of the demands of research and publishing. Although there were good perceptions about access to digital material, users noted certain limitations including restricted access to high impact journals, poor internet connectivity, lack of skills to perform complex searches and lack of understanding of all the databases accessible. The report advises upgrading the ICT infrastructure, boosting subscriptions to subject-specific databases and arranging seminars on search methods and citation tools for optimal utilization of e-resources in management institutions.

Singh and Mahajan (2021) studied the frequency and purpose of use of e-resources such as online journals, databases and digital libraries. The findings demonstrated that e-resources were widely used by academics for research, teaching and to keep up with latest advancements. Users praised the simplicity, quickness and accessibility of electronic materials. Challenges included insufficient training on sophisticated search strategies, unstable internet access and ignorance of all available resources. The authors suggest seminars, training programs and better infrastructure to facilitate successful utilization. The study indicated that e-resources are vital in achieving academic excellence and research productivity and their effective utilization depends on awareness, technical skills and institutional support. The research identifies use trends and impediments and gives practical insights for library managers to improve management of digital resources and user satisfaction at institutions of higher education.

Rani (2021) investigated awareness, frequency of usage, search tactics and satisfaction with digital resources including e-journals and databases. Findings showed that e-resources were frequently used for academic research, thesis writing and teaching preparation. Users



experienced problems such as poor search skills, poor technical assistance, and lack of awareness of accessible resources. The author highlighted the need for information literacy training, library seminars and improved digital infrastructure. The study indicated that efficient utilization of e-resources enhances research efficiency, academic performance and dissemination of information. The study provides practical recommendations for library administrators and policymakers to improve digital resource use and promote academic excellence via the exploration of user behavior and impediments.

Dhanwal et al. (2022) investigated government programmes, digital platforms and online resources deployed to aid the continuance of education during the lockdowns. The findings indicated efforts such as e-learning portals, virtual classrooms, and digital resource repositories that made excellent education accessible to students in many places. The survey pointed to obstacles such as unequal digital infrastructure, insufficient teacher preparation and connection issues in remote locations. The writers underlined the necessity of matching technology to pedagogy, building digital literacy and offering inclusive solutions for all learners. The authors, Dhanwal et al., stated that the pandemic has hastened the implementation of ICT in education and highlighted the potential and structural shortcomings. The research gives insights into policy-driven digital transformation, showing that deliberate ICT deployment may improve resilience, equality, and creativity in higher education during crises.

In a literature-based approach, AI technologies including machine learning, robotics, and predictive analytics were recognized by Javaid et al. (2022) as the main drivers of automation, efficiency, and innovation in the industrial and service industries. The main obstacles were related to the high costs of implementation, adaptability of the workforce, cybersecurity issues and integration complexity. The authors highlighted the potential of AI to revolutionize the optimization of production, supply chain management, quality control and decision-making processes. Recommendations included investment in talented staff, multidisciplinary cooperation, and implementing scalable AI solutions. Javaid et al. argued that AI adoption is important to achieve Industry 4.0 objectives including smart manufacturing, data-driven operations and sustainable industrial growth. The results offer practical insights for firms trying to harness AI to achieve operational excellence and strategic competitiveness.

Jeyapragash et al. (2022) investigated the access, frequency of use and perceived usefulness of e-resources such as e-journals, databases, digital libraries. The survey results revealed that



faculty members extensively used e-resources for research, teaching and academic cooperation. The challenges experienced were technological, lack of expertise of advanced search strategies, and even poor internet. The authors stressed the need for training programs, awareness campaigns and improvement of the digital infrastructure for better exploitation of the resources. The study indicated that the appropriate use of e-resources contributes to academic production, the quality of research, and the efficacy of instruction. The study offers practical insights into library administration and policy creation, highlighting usage trends and barriers for improving access to digital resources in engineering universities.

Shastri and Chudasma (2022) evaluated competency in digital technologies, electronic resource management and online service delivery. Findings showed that while professionals adjusted to online services, many experienced issues such as inadequate training, limited digital infrastructure, and problems with controlling remote access to e-resources. The authors highlighted the need of continual professional growth, training in new technologies and institutional support for improving the quality of services. The study showed that ICT skills are essential for library workers to provide continued academic and research services amid emergencies. The study exposes the skill gaps and problems and offers practical solutions to library administrators and policy makers to enhance digital literacy and service delivery in university libraries.

Putro (2023) examined the trends, use and efficacy of digital learning systems. Results showed that e-learning technologies enhanced accessibility, flexibility and participation in higher education, especially during times of disruption (e.g., COVID-19 pandemic). Challenges faced are lack of digital literacy, lack of technology infrastructure and lack of student enthusiasm. The author stressed the significance of teacher training, student assistance, and pedagogical reform in order to enhance the learning outcomes of virtual learning. The study revealed that e-learning is vital for contemporary education, providing remote learning, individualized training, and interactive involvement. The research maps research trends and problems to give insights for educational institutions, policy makers and researchers to increase the success of online learning efforts.

Singh, and Sharma (2023) studied the use, awareness and satisfaction of teachers and students towards electronic databases, journals and digital repositories. Findings demonstrated that e-resources greatly enhanced research efficiency, academic performance and access to current



information. Users noted the advantages of time-saving, wide-ranging material and convenience of access. Challenges included low understanding of the availability of resources, poor search skills and occasional technological issues. Authors proposed training programs, library orientation workshops and better infrastructure for successful use. The survey revealed e-resources to be a prerequisite for academic achievement and current library services. Based on the analysis of usage patterns and impediments, the study gives practical recommendations to administrators and librarians for better management of digital resources and support for knowledge production in higher educational institutions.

Sreeramoj and Batcha (2023) studied user awareness, frequency of usage and satisfaction with electronic journals, databases and digital libraries. The findings indicate that e-resources are commonly used for academic research, project work and curricular support. Users liked the ease, the extensive coverage and rapid access to information. Challenges included lack of knowledge of advanced search strategies, lack of training and sporadic technological glitches. The authors suggested the effective use of library through library orientation programmes, tailored seminars and enhanced infrastructure. The study identifies use trends and impediments and gives practical recommendations for librarians and administrators to enhance digital resource management and maximize benefits for students and teachers.

Significance of the Study

This study is essential because it stresses the crucial role the ICT plays in creating modern education and boosting instructor performance. Given the continuous transfer of the educational sector to digital platforms, the ICT competency of faculty members becomes a factor of institutional performance and students' learning outcomes. This study examines the extent of ICT usage and proficiency among faculty, providing useful information on the readiness of educators to integrate technology into teaching, research, and administrative activities. The findings can guide the policy makers, administrators and faculty development programs in areas needing assistance, training and investment to improve institutional efficiency and creativity. Furthermore, identifying faculty issues and gaps in ICT competency can inform the development of tailored interventions for improving digital skills, promoting lifelong learning, and encouraging the use of new technologies. Moreover, this study adds to the wider conversation on digital literacy in higher education by emphasizing the need to provide an atmosphere that supports ongoing professional growth. Finally, the research intends



to enable higher education to evolve into a digitally enabled environment where faculty members can meet the changing needs of the digital era.

Scope of the Study

The present study is confined to the faculty members of the colleges connected to Bharathiar University, Coimbatore and their use of ICT and proficiency in teaching, research and administrative duties. The research explores fundamental and advanced ICT competencies of faculty members, such as utilizing digital learning management systems, online collaboration platforms, multimedia instructional materials, virtual classrooms, and accessing digital research databases. The study also examines other contributing factors such as faculty demographics, disciplines, years of experience and previous ICT training to evaluate the impact of these variables on technology uptake and competency. The present study further analyzes the attitude of faculty towards ICT, amount of ICT usage, frequency of ICT usage and perceived impediments for efficient integration of digital in the context of Coimbatore colleges. It is focused on faculty members and the study is not extended to students and administrative personnel. It does not focus on technical performance of institutional ICT infrastructure even if these aspects impact ICT use indirectly. The study is intended to offer practical insights to the college administrators, policymakers and faculty development programs affiliated with Bharathiyar University to guide in improving the technological competence, fostering effective ICT adoption and developing a digitally skilled academic workforce. Finally the aim is to find the ways for the faculty members to address the changing needs of the digital world to ensure that Bharathiyar University affiliated institutions of Coimbatore provide quality education using technology.

Statement of the Problem

While ICT integration is growing in higher education, faculty members in Bharathiyar University-affiliated colleges in Coimbatore sometimes find it difficult to use technology successfully to improve teaching, research and administrative efficiency. Many universities have embraced digital technologies, such as learning management systems, online assessment platforms, and virtual classrooms, but their use mostly depends on faculty proficiency and desire to integrate technology into daily academic activities. Many educators have different degrees of digital literacy, limited access to current ICT facilities, and poor institutional support, which might prevent them from fully harnessing the potential of digital technologies.



This imbalance affects not just the quality of instruction and student involvement, but also research output and the general competitiveness of the schools in the continually shifting educational landscape.

The challenge is further aggravated by the quick speed of technology changes that need continual professional growth, competence enhancement and adaptability on the part of faculty members. These problems are compounded by the lack of sufficient training programmes, limited exposure to emerging technology and uneven infrastructure capacities in the colleges affiliated to Bharathiyar University. It is therefore important to understand the present levels of ICT use and analyze the faculty competence in these colleges in order to identify the gaps and plan targeted solutions. This study aims to provide practical insights by systematically exploring these issues, which can help faculty development, enhance digital literacy, and encourage effective technology integration, leading to more innovative teaching practices, increased administrative efficiency, and better academic outcomes in the Coimbatore higher education environment.

Importance of ICT Skills in Academic Libraries

ICT has become an integral component of library operations and services. The adoption of automation software, digital repositories, online public access catalogs (OPACs), cloud-based systems, and electronic resources has transformed the role of library professionals. The importance of ICT skills among library professionals can be understood through the following aspects:

1. Efficient Library Management

Information and Communication Technology (ICT) has significantly improved the efficiency of library management in higher educational institutions. Modern library management systems automate routine functions such as cataloging, circulation, acquisition, inventory control, and serial management. Automation reduces manual errors, saves time, and enhances the accuracy of library operations. Librarians can easily maintain records of books, journals, and other resources through integrated software systems. ICT also enables quick retrieval of information and efficient tracking of borrowed and returned materials. Barcode and RFID technologies further streamline circulation processes and inventory management. Additionally, digital record-keeping minimizes paperwork and facilitates better decision-making through data



analysis and reporting tools. As a result, libraries can optimize their resources, improve operational efficiency, and provide more effective services to users.

2. Access to Digital Information Resources

ICT has transformed libraries into gateways for accessing vast digital information resources. Through electronic databases, e-books, e-journals, institutional repositories, and online archives, users can obtain information anytime and from anywhere. Digital libraries provide instant access to scholarly materials, reducing dependence on physical collections. Students, researchers, and faculty members can search, retrieve, and download relevant information efficiently using online catalogues and search engines. Remote access facilities allow users to utilize library resources beyond campus boundaries, supporting distance learning and research activities. ICT also facilitates access to open educational resources and international databases, broadening knowledge opportunities. Consequently, libraries play a crucial role in supporting academic excellence by ensuring timely, convenient, and comprehensive access to quality information resources.

3. Enhanced User Services

ICT has greatly enhanced the quality and scope of services offered by libraries. Modern libraries provide online public access catalogues (OPACs), digital reference services, virtual assistance, and automated circulation systems that improve user convenience. Library users can search for resources, reserve books, renew borrowed materials, and receive notifications through online platforms. ICT also supports personalized services by offering user profiles, reading recommendations, and customized alerts. Mobile applications and library websites enable users to access information and services remotely. Furthermore, multimedia resources, online tutorials, and information literacy programs help users develop research and digital skills. These technological advancements improve user satisfaction, increase library usage, and create a more responsive and user-centered learning environment within educational institutions.

4. Research Support

ICT plays a vital role in supporting research activities within higher educational institutions. Libraries provide access to scholarly databases, citation management tools, digital repositories,



and research analytics platforms that assist researchers throughout the research process. Researchers can conduct literature reviews, identify relevant studies, and access current scientific findings efficiently. ICT tools also facilitate plagiarism detection, reference management, data analysis, and scholarly communication. Institutional repositories help preserve and disseminate research outputs, increasing their visibility and impact. Libraries further support researchers through online training programs, webinars, and research consultation services. By providing seamless access to information and advanced research tools, ICT enables researchers to enhance the quality, productivity, and global reach of their academic and scientific contributions.

5. Resource Sharing and Networking

ICT has strengthened resource sharing and networking among libraries, enabling greater collaboration and access to information. Through library networks, consortia, and interlibrary loan systems, institutions can share books, journals, databases, and other resources efficiently. Digital communication technologies facilitate cooperation among libraries at regional, national, and international levels. Union catalogues and shared databases allow users to identify and access materials available in different libraries. Resource-sharing initiatives reduce duplication of collections and optimize financial investments in information resources. ICT also supports collaborative projects, knowledge exchange, and professional development among library professionals. As a result, libraries can expand their collections, improve service delivery, and provide users with access to a broader range of information resources than any single library could offer independently.

ICT Competencies Required for Library Professionals

Operating Computers and Peripheral Devices (120 Words)

The ability to operate computers and peripheral devices is a fundamental ICT skill required for library professionals. Librarians use desktop computers, laptops, printers, scanners, photocopiers, barcode readers, RFID systems, and multimedia equipment to perform daily library operations. Proficiency in handling these devices ensures smooth execution of tasks such as cataloging, circulation, document digitization, and information retrieval. Library professionals must understand hardware components, device connectivity, and basic maintenance procedures to minimize disruptions in service delivery. Familiarity with operating



systems and device settings further enhances productivity and efficiency. Effective use of computer hardware enables librarians to support users, manage library resources, and maintain technological infrastructure. Consequently, this skill forms the foundation for delivering modern and technology-driven library services.

Using Office Productivity Software

Office productivity software is an essential tool for library professionals in managing administrative and academic responsibilities. Applications such as word processors, spreadsheets, presentation software, and database management tools help librarians prepare reports, maintain records, analyze data, and create instructional materials. Word processing software is commonly used for drafting policies, correspondence, and documentation, while spreadsheets assist in budgeting, inventory management, and statistical analysis. Presentation software supports user education programs, workshops, and professional training sessions. Proficiency in these applications improves accuracy, efficiency, and communication within the library environment. Additionally, cloud-based productivity tools facilitate collaboration and document sharing among staff members. Mastery of office productivity software enables library professionals to perform their duties effectively and support institutional objectives.

Internet Browsing and Online Communication

Internet browsing and online communication skills are critical for library professionals in accessing, evaluating, and disseminating information. Librarians frequently use web browsers to search scholarly databases, digital libraries, online catalogs, and educational resources. Effective browsing skills help identify reliable and relevant information sources while avoiding misinformation. Online communication tools such as video conferencing platforms, instant messaging applications, and social media channels enable librarians to interact with users and colleagues efficiently. These technologies support virtual reference services, online learning programs, and professional networking activities. Library professionals must also understand web navigation, search strategies, and digital etiquette to maximize communication effectiveness. Strong internet and online communication skills enhance information accessibility, collaboration, and service quality in modern academic libraries.



Email Management

Email management is a vital ICT competency for library professionals, as email remains one of the primary modes of professional communication. Librarians use email to communicate with students, faculty members, publishers, vendors, and other libraries. Effective email management involves composing professional messages, organizing correspondence, maintaining contact lists, and managing attachments securely. Skills such as filtering messages, creating folders, scheduling emails, and handling spam contribute to increased productivity and efficiency. Email also serves as a platform for sending notifications regarding overdue books, library events, training programs, and resource updates. Proper email etiquette and security awareness are essential for maintaining professionalism and protecting sensitive information. Consequently, strong email management skills support effective communication and service delivery in libraries.

File Handling and Data Storage

File handling and data storage skills are essential for organizing and safeguarding library information resources. Library professionals regularly create, save, retrieve, modify, and share digital files related to library operations, user records, and institutional documents. Understanding file formats, folder structures, naming conventions, and backup procedures helps ensure efficient information management. Knowledge of cloud storage services and network drives enables secure storage and easy access to digital resources. Librarians must also be familiar with data security practices, including password protection, encryption, and access control measures. Proper file management reduces the risk of data loss, improves workflow efficiency, and facilitates information retrieval. These skills contribute significantly to maintaining organized and secure digital library environments.

Basic Troubleshooting

Basic troubleshooting skills enable library professionals to identify and resolve common technical problems without requiring immediate external assistance. Librarians often encounter issues such as software errors, printer malfunctions, network connectivity problems, login difficulties, and hardware performance issues. Knowledge of diagnostic techniques helps in quickly identifying the source of a problem and implementing appropriate solutions. Basic troubleshooting includes restarting systems, checking connections, updating software, clearing



cache files, and configuring device settings. These skills minimize downtime, maintain uninterrupted library services, and improve user satisfaction. Furthermore, troubleshooting competence enhances confidence in using technology and supports efficient management of ICT infrastructure. As libraries increasingly depend on digital technologies, basic troubleshooting has become an indispensable skill for modern library professionals.

Conclusion

The integration of Information and Communication Technology has fundamentally transformed academic libraries and expanded the roles of library professionals. ICT competencies have become essential for managing digital resources, supporting research activities, delivering innovative services, and ensuring efficient library operations. Assessing ICT skills among library professionals in higher educational institutions is crucial for identifying competency gaps, improving service quality, and promoting professional development.

While challenges such as inadequate training, rapid technological change, and resource limitations persist, institutions can address these issues through continuous professional development, infrastructure enhancement, and strategic capacity-building initiatives. As libraries continue to evolve in response to technological advancements, library professionals must embrace lifelong learning and continuously update their ICT competencies. Regular assessment and targeted skill development will ensure that academic libraries remain dynamic centers of knowledge, innovation, and learning in the digital age.

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