BHARATI INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH & DEVELOPMENT (BIJMRD)

(Open Access Peer-Reviewed International Journal)

DOI Link : https://doi.org/10.70798/Bijmrd/03020002

Available Online: www.bijmrd.com|BIJMRD Volume: 3| Issue: 02| February 2025| e-ISSN: 2584-1890

ICT in Libraries : Ensuring Continuity of Academic Services During the Pandemic

Sanjay Kumar Suman

Research Scholar, Department of Library Science, RKDF University, Ranchi, India

Abstract:

The COVID-19 pandemic significantly disrupted traditional academic services, compelling libraries to adopt Information and Communication Technology (ICT) to ensure the continuity of learning and research. This study explores the impact of ICT adoption in academic libraries during the pandemic, identifies key digital tools that facilitated remote learning and research, and examines the evolving role of library professionals in managing ICT-driven services. Utilizing content analysis, the study reviews existing literature, case studies, and institutional reports to assess the effectiveness of ICT-based library services. Findings indicate that digital repositories, virtual reference services, learning management systems, and cloud-based platforms played a crucial role in sustaining academic activities. Additionally, library professionals had to rapidly adapt to new digital competencies, redefining their roles in an ICT-intensive environment. While ICT adoption enhanced accessibility and service delivery, challenges such as the digital divide, technical constraints, and inadequate ICT training persisted. The study highlights the long-term implications of ICT integration in libraries and suggests strategies to enhance digital library services for future academic resilience.

Keywords: *ICT in libraries, Academic Services, Remote Learning, Digital Tools, COVID-19, Digital Transformation.*

1. Introduction

ICT played a crucial role in enabling remote access to library services, digital repositories, e-books, virtual reference services, and online databases, ensuring that students, researchers, and faculty members could continue their academic activities despite physical closures (Ali &Gatiti, 2020). Libraries that had already integrated ICT before the pandemic found it easier to transition to fully online operations, while others had to rapidly adapt to digital solutions to maintain service delivery (Tammaro, 2020).

The integration of ICT in libraries during the pandemic was not merely about providing digital access but also about ensuring equity in education. Many academic institutions faced challenges related to digital divide issues, where students from underprivileged backgrounds struggled with internet access and necessary devices (Radha et al., 2020). Libraries addressed these challenges by offering open-access digital resources, strengthening institutional repositories, and collaborating with publishers to provide free or discounted access to academic content (IFLA, 2020). Additionally, the use of ICT facilitated innovative library services

such as virtual training sessions, digital literacy programs, and remote research assistance, which helped users effectively utilize electronic resources (Bamidele et al., 2021).

Furthermore, ICT tools such as Learning Management Systems (LMS), artificial intelligence (AI)-powered chatbots, and cloud-based library management systems played a vital role in enhancing user engagement. Many libraries expanded their online presence through social media, webinars, and interactive platforms to ensure continuous communication with their patrons (Xu & Saxton, 2021). The adoption of open-source software solutions for digital archiving and library automation also became more prevalent, allowing institutions to manage digital collections efficiently (Kumar, 2021).

Despite the advancements, challenges such as cybersecurity threats, inadequate digital infrastructure in some regions, and the need for extensive staff training emerged as critical issues (Chisita&Chiparausha, 2021). However, the crisis also highlighted the resilience of academic libraries in embracing technological innovations to meet the evolving needs of users. The post-pandemic future of libraries is expected to be a hybrid model that integrates both physical and digital services, ensuring greater flexibility and accessibility (Atske& Perrin, 2021).

ICT proved to be a game-changer for academic libraries during the pandemic, enabling them to continue supporting education and research despite unprecedented disruptions. The experience underscored the importance of digital transformation in academic institutions, reinforcing the need for sustainable ICT policies to enhance future library resilience. As libraries move forward, investment in digital infrastructure, training, and user-oriented services will be crucial in shaping the future of academic information access and dissemination.

1.1. Theoretical Framework of the Study

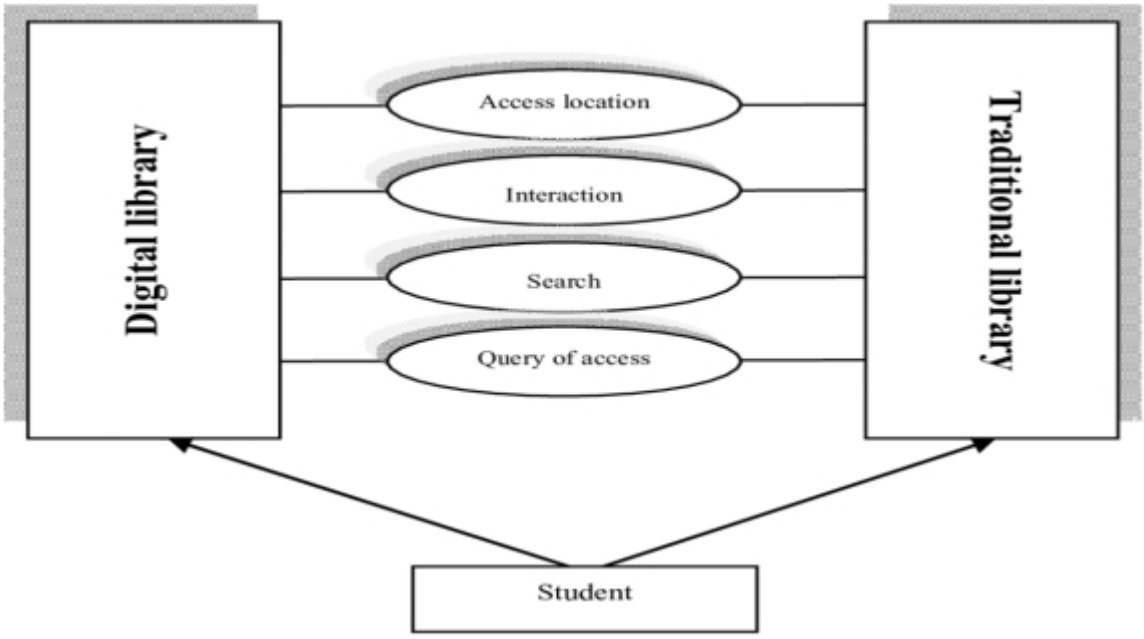

Figure 1.1: Showing the Theoretical Framework of the Study

Source: https://www.researchgate.net/publication/245023375_Usefulness_of_digital_and_traditional_libraries_in_higher_education

The transition from traditional to digital libraries in the context of ICT adoption has been a crucial factor in ensuring the continuity of academic services during the pandemic. Evaluating the performance and usefulness of libraries requires a structured framework that reflects their contribution to users. The fundamental functions—access location, interaction, search, and query of access—serve as key indicators for assessing both traditional and digital libraries. These functions comprehensively cover the essential aspects of library services, making them a suitable framework for comparison.

In the shift from traditional to digital libraries, access location determines how easily users can reach resources, whether physically or digitally. Interaction measures the level of engagement between users and library services, including virtual assistance and digital collaboration tools. Search capabilities highlight the efficiency of retrieving relevant academic materials, while query of access reflects the effectiveness of information retrieval systems in both environments. These functions are present in both traditional and digital libraries, ensuring an unbiased comparison of attributes and providing transparency in the study.

The framework for this comparison has been adapted from Devchoudhary (2007), who described the evolving role of libraries in the digital era. By analyzing these attributes, the study objectively examines how ICT has facilitated the transition from traditional to digital libraries, ensuring uninterrupted academic support during the pandemic. This approach not only highlights the strengths of both models but also provides insights into how libraries can further enhance their ICT-driven services for sustained academic engagement.

1.2. The Statement of the Problem

The COVID-19 pandemic disrupted traditional library services, highlighting the urgent need for academic libraries to adopt ICT for uninterrupted access to learning and research resources. The shift from physical to digital platforms posed challenges in accessibility, digital literacy, and infrastructure. Libraries had to integrate ICT tools such as digital repositories, virtual reference services, and remote authentication systems to support users. However, the effectiveness of these adaptations and their long-term implications remain underexplored. This study examines the role of ICT in ensuring the continuity of academic services in libraries during the pandemic, assessing its impact, challenges, and future prospects.

1.3. The Significance of the Study

This study on *ICT in Libraries: Ensuring Continuity of Academic Services During the Pandemic* is significant as it explores how academic libraries leveraged technology to sustain learning and research during a global crisis. The rapid shift to digital platforms highlighted the importance of ICT tools such as digital repositories, virtual reference services, and remote access systems in ensuring seamless academic engagement. By analyzing the impact of ICT adoption, this research provides valuable insights for librarians, educators, and policymakers on improving digital infrastructure, enhancing accessibility, and addressing challenges in remote learning environments. The study also underscores the evolving role of library professionals in adapting to technological advancements, contributing to the broader discourse on digital inclusion and the future of academic libraries in a technology-driven world.

1.4. The Research Questions

RQ_1: How did the adoption of ICT effect academic libraries during the pandemic?

RQ_2: What were the key ICT tools used by academic libraries to support remote learning and research?

RQ_3: How did library professionals adapt to ICT-driven academic services during the pandemic?

1.5. The Objectives of the Study

O_1: To analyze the effect of ICT adoption in academic libraries during the pandemic.

O_2:To identify the key ICT tools used in libraries to support remote learning and research.

O_3:To investigate the role of library professionals in adapting to ICT-driven academic services.

2. The Review of Related Literature

According to Dadzie (2005), ICT integration enhances access to digital resources, improves search capabilities, and facilitates remote access to scholarly materials. Similarly, Fatoki (2005) highlights that academic libraries are increasingly relying on digital repositories, e-books, and online databases to support research and learning, ensuring uninterrupted access even during crises like the COVID-19 pandemic.Chowdhury and Foo (2012) emphasize that digital libraries equipped with ICT tools offer enhanced user experience through advanced search algorithms and personalized recommendations. Furthermore, Krubu and Osawaru (2011) argue that ICT adoption has significantly improved library operations, making resource sharing, knowledge dissemination, and user interaction more efficient.A study by Ani, Ngulube, and Onyancha (2015) points out that many academic institutions in developing countries face difficulties in maintaining digital resources due to inadequate funding and limited ICT expertise among librarians. Additionally, Ogunsola (2011) notes that slow internet connectivity and lack of technical support hinder the full utilization of ICT in library services.According to Ali and Gatiti (2020), academic libraries rapidly adapted by offering virtual reference services, online research consultations, and digital literacy training. Similarly, Singh, Kumar, and Basu (2021) found that ICT-driven library services, including open-access platforms and remote authentication systems, played a vital role in ensuring students and researchers continued to access academic resources despite physical closures.According to Tenopir et al. (2015), emerging technologies such as artificial intelligence (AI), machine learning, and big data analytics are expected to further enhance digital libraries by providing predictive analytics for user needs. Meanwhile, Lippincott (2015) argues that libraries must continue investing in ICT training for librarians and upgrading digital infrastructures to remain relevant in the evolving academic landscape.

2.1. The Research Gap

Although ICT adoption in academic libraries during the pandemic has been widely discussed, research lacks a comprehensive analysis of its actual impact on library efficiency and user satisfaction. While various ICT tools were utilized to support remote learning and research, there is limited literature on their comparative effectiveness in different academic settings. The evolving role of library professionals in managing ICT-driven services remains underexplored, particularly in terms of skill adaptation and workload changes. Additionally, studies seldom address the long-term implications of ICT adoption beyond emergency responses. This study aims to bridge these gaps by assessing the impact, key tools, and professional adaptability in ICT-driven academic libraries.

3. The Methodology of the Study

This study adopts content analysis as its primary methodology to systematically examine the impact of ICT adoption in academic libraries during the pandemic. Content analysis involves the qualitative and quantitative examination of existing literature, institutional reports, and case studies related to ICT-driven academic services. By analyzing scholarly articles, digital library usage reports, and professional insights, the study identifies key ICT tools used for remote learning and research, evaluates their effectiveness, and explores the evolving role of library professionals in adapting to technological advancements. The method

ensures an objective and structured assessment by categorizing recurring themes, trends, and challenges associated with ICT integration in libraries. This approach provides a comprehensive understanding of how academic libraries leveraged ICT to ensure continuity of services during the pandemic.

4. The Analysis and Interpretation

Pertaining to Objective 1

O_1: To analyze the effect of ICT adoption in academic libraries during the pandemic.

The COVID-19 pandemic brought unprecedented challenges to academic institutions, including libraries, which serve as essential hubs for learning and research. The necessity to continue academic services despite physical closures accelerated the adoption of Information and Communication Technology (ICT) in libraries. ICT played a crucial role in ensuring uninterrupted access to information, facilitating remote learning, and redefining the role of library professionals. The integration of digital tools and platforms allowed libraries to sustain academic activities, although it also presented several challenges.

Expansion of Digital Access to Academic Resources

One of the most significant effects of ICT adoption in academic libraries was the rapid expansion of digital resources. As libraries closed their physical spaces, institutions had to enhance their electronic collections, including e-books, e-journals, institutional repositories, and open-access databases (IFLA, 2020). Many academic libraries partnered with publishers to provide temporary free access to digital content, ensuring that students and researchers could continue their academic work (Kumar, 2021).

Remote authentication tools such as Virtual Private Networks (VPNs) and proxy servers became essential in providing off-campus access to digital materials. The use of digital repository systems, including DSpace and EPrints, further facilitated the availability of research outputs (Bamidele et al., 2021). This digital shift not only addressed immediate access needs during the pandemic but also laid the foundation for a more technology-driven academic library system in the post-pandemic era.

Virtual Reference Services and User Engagement

The adoption of ICT in academic libraries also transformed the way librarians interacted with users. With physical reference desks unavailable, libraries introduced virtual reference services through email, chatbots, video conferencing, and social media platforms (Ali &Gatiti, 2020). AI-powered chatbots were increasingly used to provide real-time assistance to users, reducing the burden on library staff and improving response efficiency (Xu & Saxton, 2021).

Additionally, libraries integrated their services with Learning Management Systems (LMS) such as Moodle and Blackboard, allowing students and faculty to access library materials directly from their online courses (Radha et al., 2020). Online workshops, webinars, and digital literacy programs were also introduced to help users navigate digital resources effectively. These virtual interactions enhanced user engagement and promoted independent research skills among students.

Challenges in ICT Implementation

Despite the benefits of ICT adoption, academic libraries faced several challenges during the transition. The **digital divide** became a significant concern, as not all students and faculty members had equal access to high-speed internet and digital devices (Atske& Perrin, 2021). Many institutions struggled to provide digital infrastructure, particularly in developing countries where internet penetration remains low.

Cybersecurity was another major challenge, as the shift to online services increased the risk of data breaches and unauthorized access to institutional resources (Chisita&Chiparausha, 2021). Libraries had to implement advanced security measures such as multi-factor authentication and encrypted connections to protect sensitive information.

Additionally, library professionals faced difficulties in adapting to new digital tools and technologies. The sudden transition to ICT-driven services required them to acquire new technical skills, leading to an increased demand for digital literacy training programs (Tammaro, 2020). Libraries had to invest in staff development initiatives to ensure smooth service delivery and operational efficiency.

The Role of Library Professionals in ICT-Driven Services

The pandemic significantly reshaped the role of library professionals, requiring them to become more tech-savvy and proactive in digital service management. Librarians were responsible for curating digital content, managing online repositories, and assisting users with digital tools (Bamidele et al., 2021). Many academic libraries organized internal training sessions to enhance the digital competencies of their staff, ensuring they could effectively support remote users (Chisita&Chiparausha, 2021).

The role of librarians also expanded to include digital content creation, such as producing instructional videos, research guides, and online tutorials. This shift towards proactive user support demonstrated the evolving nature of academic librarianship in a technology-driven environment.

Long-Term Impact and Future Implications

The adoption of ICT during the pandemic has left a lasting impact on academic libraries. While initially a response to crisis conditions, digital transformation has now become an integral part of library services. Many institutions have recognized the benefits of a **hybrid library model**, combining both physical and digital access to resources (Kumar, 2021).

Post-pandemic, academic libraries are expected to continue investing in ICT infrastructure, ensuring long-term sustainability and resilience against future disruptions. Strategies such as improving digital literacy among users, enhancing cybersecurity measures, and expanding open-access initiatives will play a crucial role in shaping the future of academic libraries (IFLA, 2020). The experience gained during the pandemic has highlighted the importance of continuous innovation in library services to meet the evolving needs of the academic community.

The adoption of ICT in academic libraries during the COVID-19 pandemic was a transformative process that ensured the continuity of academic services. The expansion of digital access, the introduction of virtual reference services, and the evolving role of library professionals highlighted the resilience of academic institutions in adapting to technological changes. However, challenges such as the digital divide, cybersecurity risks, and the need for continuous staff training remain critical areas for improvement. The lessons learned from this period will continue to shape the future of academic libraries, reinforcing the need for ongoing investment in ICT to support education and research in an increasingly digital world.

Pertaining to Objective 2

O_2: To identify the key ICT tools used in libraries to support remote learning and research.

The rapid transition to online education and remote research during the COVID-19 pandemic underscored the importance of Information and Communication Technology (ICT) tools in academic libraries. Libraries worldwide adopted various digital platforms, cloud-based services, and virtual assistance tools to ensure

seamless access to learning materials and research resources (Ali &Gatiti, 2020). These ICT tools facilitated remote learning, digital collaboration, and research continuity, transforming traditional library operations into fully digital environments. The following sections discuss the key ICT tools that played a crucial role in supporting remote learning and research.

Digital Repositories and Open Access Platforms

Digital repositories and open-access platforms became essential for ensuring continued access to academic resources. These repositories provided students and researchers with scholarly articles, e-books, theses, and institutional research outputs without requiring physical access to library buildings. Platforms such as **DSpace, EPrints, and Fedora Commons** were widely used by academic institutions to store and manage digital content (Kumar, 2021).

Additionally, libraries promoted **Open Access (OA) platforms** such as **PubMed Central, ArXiv, and the Directory of Open Access Journals (DOAJ)**, which provided unrestricted access to scholarly materials (IFLA, 2020). These resources played a critical role in supporting remote research and learning, as many commercial publishers also temporarily lifted paywalls to facilitate access during the pandemic (Radha et al., 2020).

Learning Management Systems (LMS) Integration

Libraries integrated their digital collections and services into **Learning Management Systems (LMS)** such as **Moodle, Blackboard, and Google Classroom** to enhance remote education. LMS platforms allowed students and faculty to access library materials, research guides, and e-books directly from their course modules (Bamidele et al., 2021).

Furthermore, libraries conducted virtual training sessions through LMS platforms, educating students on effective database searches, citation management, and academic integrity. This integration streamlined research activities and ensured that students could access essential materials without additional logins or software installations (Chisita&Chiparausha, 2021).

Virtual Reference and Chatbot Services

With physical reference desks unavailable, libraries implemented **virtual reference services** to provide remote assistance to users. Real-time chat platforms like **LibChat, OCLC QuestionPoint, and Ask a Librarian** enabled library staff to guide students and researchers in accessing digital resources (Ali &Gatiti, 2020).

Libraries also introduced **AI-driven chatbots** to handle frequently asked questions and provide automated responses. Chatbots using **Natural Language Processing (NLP)** improved user experience by offering 24/7 assistance in locating resources, understanding search techniques, and troubleshooting access issues (Xu & Saxton, 2021). These AI-powered tools reduced response times and enhanced the accessibility of library services.

Remote Access and Authentication Tools

Ensuring secure access to subscription-based digital resources was a major challenge during remote learning. Libraries adopted **Virtual Private Networks (VPNs), proxy servers, and Single Sign-On (SSO) authentication** tools such as **EZproxy and OpenAthens** to enable seamless off-campus access to academic databases (IFLA, 2020).

These remote authentication systems allowed students and faculty to retrieve journal articles, research papers, and library catalogs from anywhere in the world. **Multi-factor authentication (MFA)** was also implemented in some libraries to enhance security and prevent unauthorized access to institutional digital collections (Kumar, 2021).

Video Conferencing and Webinars for Library Instruction

The transition to online learning increased the need for virtual library instruction. Libraries used **video conferencing tools** such as **Zoom, Microsoft Teams, and Google Meet** to conduct research consultations, digital literacy sessions, and training workshops (Radha et al., 2020).

Many academic libraries organized **webinars and virtual orientations** to introduce students to available digital resources and research strategies. Librarians collaborated with faculty members to provide **embedded information literacy instruction**, ensuring that students developed essential digital research skills within their coursework (Tammaro, 2020).

Collaborative Research and Citation Management Tools

Remote research required efficient collaboration among students, faculty, and researchers. Libraries promoted the use of **collaborative research tools** such as **Mendeley, Zotero, and EndNote** for citation management and reference organization (Bamidele et al., 2021). These tools facilitated the seamless collection, annotation, and sharing of academic sources.

Additionally, cloud-based platforms such as **Google Drive, OneDrive, and Dropbox** allowed researchers to collaborate on documents, datasets, and reports from different locations. These tools ensured that research activities remained uninterrupted despite geographical barriers (Chisita&Chiparausha, 2021).

Online Public Access Catalogs (OPAC) and Discovery Services

Libraries improved their **Online Public Access Catalogs (OPACs)** and discovery services to enable remote users to locate resources efficiently. Discovery platforms such as **EBSCO Discovery Service, Primo, and Summon** provided a unified search interface that integrated multiple databases, e-books, and multimedia resources (Ali &Gatiti, 2020).

Mobile-friendly OPACs allowed users to search for books and check their availability through smartphone applications. This improved accessibility and convenience, particularly for students and researchers accessing library services from remote locations (IFLA, 2020).

Institutional Repositories and Research Data Management

Academic libraries expanded their **institutional repositories** to store and disseminate research outputs. Platforms such as **Figshare, Zenodo, and Dryad** facilitated the sharing of research data, dissertations, and preprints (Kumar, 2021). These repositories ensured that academic contributions remained accessible to the global research community.

Libraries also implemented **data management planning tools** such as **DMPTool and Open Science Framework (OSF)** to help researchers organize, store, and share their datasets. These platforms supported compliance with funding agency requirements and promoted open science initiatives (Tammaro, 2020).

The adoption of ICT tools significantly enhanced the ability of academic libraries to support remote learning and research during the COVID-19 pandemic. Digital repositories, LMS integration, virtual reference services, and authentication tools provided seamless access to academic materials. Video conferencing

platforms, collaborative research tools, and institutional repositories further improved remote education and scholarly communication. While the transition presented challenges such as digital literacy gaps and cybersecurity concerns, these ICT innovations have paved the way for a more resilient and technology-driven future for academic libraries.

Pertaining to Objective 3

O_3:To investigate the role of library professionals in adapting to ICT-driven academic services.

The COVID-19 pandemic accelerated the integration of Information and Communication Technology (ICT) in academic libraries, transforming how library professionals deliver services to students, faculty, and researchers. As physical access to library resources was restricted, librarians had to rapidly adopt digital tools, redefine their roles, and develop innovative strategies to meet evolving academic needs (Ali &Gatiti, 2020). Their ability to adapt to ICT-driven academic services ensured the continuity of remote learning and research. The following sections analyze the key roles played by library professionals in this transition.

Facilitating Digital Resource Access and Management

One of the primary responsibilities of library professionals during the pandemic was ensuring uninterrupted access to digital resources. Librarians expanded **electronic collections**, negotiated with publishers for temporary open-access privileges, and integrated databases into institutional learning management systems (Bamidele et al., 2021). Many libraries strengthened their **institutional repositories** using platforms like DSpace and EPrints to provide open access to theses, dissertations, and research publications (Kumar, 2021).

Library professionals also played a crucial role in **curating digital resources** by recommending e-books, electronic journals, and databases that aligned with curriculum requirements. They enhanced **metadata indexing and search functionalities** in Online Public Access Catalogs (OPACs) to ensure that users could efficiently locate digital materials (Tammaro, 2020).

Enhancing Virtual Reference and User Support Services

With the shift to online learning, library professionals had to redesign reference services to meet the needs of remote users. Many academic libraries adopted **virtual reference tools** such as **LibChat, OCLC QuestionPoint, and email-based consultation services** (Ali &Gatiti, 2020).

Librarians also leveraged **Artificial Intelligence (AI)-driven chatbots** to assist users with common queries, such as accessing databases, retrieving e-books, and formatting citations (Xu & Saxton, 2021). These tools improved response times and enhanced user experience, especially for students in different time zones.

Additionally, **one-on-one virtual research consultations** via platforms like **Zoom, Microsoft Teams, and Google Meet** allowed librarians to provide personalized guidance on database searches, literature reviews, and citation management tools like Mendeley and Zotero (Radha et al., 2020).

Conducting Digital Literacy and Information Skills Training

Library professionals played a critical role in equipping students and faculty with digital literacy skills necessary for effective online learning and research. They designed and delivered **webinars, video tutorials, and online workshops** on topics such as:

- Effective use of databases and search engines
- Citation management and avoiding plagiarism

- Evaluating online information for credibility
- Navigating open-access resources (Chisita&Chiparausha, 2021)

Libraries also integrated **information literacy modules into Learning Management Systems (LMS)** such as Moodle and Blackboard, ensuring that students could access instructional content asynchronously (IFLA, 2020). These training initiatives were essential in bridging the digital divide and empowering users with research competencies.

Supporting Faculty in Online Teaching and Course Design

Librarians collaborated closely with faculty members to adapt teaching methodologies to the digital environment. They assisted in:

- Embedding e-resources into course syllabi
- Designing virtual reading lists
- Creating digital learning objects and interactive content (Bamidele et al., 2021)

Many academic libraries established **teaching support units** that helped faculty integrate multimedia resources, open educational resources (OER), and adaptive learning tools into their courses (Kumar, 2021). This collaboration ensured that students had seamless access to learning materials while engaging in remote education.

Implementing Remote Access and Authentication Solutions

Library professionals played a pivotal role in managing **remote authentication tools** that allowed students and researchers to securely access subscription-based digital resources. Technologies such as **EZproxy, OpenAthens, and Virtual Private Networks (VPNs)** were configured to enable off-campus access to library collections (IFLA, 2020).

Additionally, librarians implemented **Single Sign-On (SSO) authentication** to simplify user access and enhance security. These measures ensured that institutional users could retrieve academic materials from anywhere while maintaining compliance with licensing agreements (Kumar, 2021).

Promoting Open Science and Research Data Management

With increased demand for open-access research, library professionals took on a more active role in promoting **Open Science initiatives**. They provided guidance on:

- Depositing preprints and research outputs in open-access repositories
- Complying with funding agencies' open data policies
- Managing and sharing research data using platforms like **Figshare, Zenodo, and Dryad** (Tammaro, 2020)

Libraries also facilitated the adoption of **Research Data Management (RDM) plans** to help scholars organize datasets effectively and ensure long-term preservation of academic outputs (Radha et al., 2020).

Strengthening Digital Collaboration and Knowledge Sharing

Library professionals encouraged **collaborative knowledge-sharing** among students, faculty, and researchers through digital platforms such as:

- **Google Drive, OneDrive, and Dropbox** for document collaboration
- **Mendeley and Zotero** for group research and reference management
- **Slack and Microsoft Teams** for scholarly discussions and peer support (Chisita&Chiparausha, 2021)

These tools facilitated group work, remote research collaborations, and the dissemination of knowledge across institutions. Many libraries also developed **online community engagement programs**, such as digital book clubs and virtual research forums, to maintain academic interaction and intellectual discourse.

Ensuring Digital Equity and Accessibility

Library professionals played a crucial role in addressing the **digital divide** by advocating for equitable access to learning resources. Some key initiatives included:

- **Loaning out digital devices** (laptops, tablets, and mobile hotspots) to students from underserved communities
- Ensuring that digital platforms complied with **web accessibility standards** (WCAG) for students with disabilities
- Providing **alternative formats** of academic content, such as audiobooks and Braille resources (Ali &Gatiti, 2020)

These efforts ensured that all students, regardless of socio-economic background, had access to the necessary tools for remote learning and research.

The role of library professionals evolved significantly during the pandemic, requiring them to embrace ICT-driven academic services and develop innovative solutions to meet remote learning needs. From facilitating digital resource access and providing virtual reference services to supporting faculty in online teaching and ensuring digital equity, librarians played a critical role in maintaining academic continuity. The pandemic underscored the importance of **digital transformation in libraries**, emphasizing the need for continuous training, policy updates, and investment in emerging technologies to sustain the future of academic librarianship.

5. Conclusion

The adaptation of library professionals to ICT-driven academic services during the pandemic was crucial in ensuring the continuity of learning and research. By facilitating digital resource access, enhancing virtual reference services, conducting digital literacy training, supporting faculty in online teaching, and ensuring remote authentication, librarians played a pivotal role in sustaining academic engagement. Their efforts in promoting open science, strengthening digital collaboration, and addressing digital equity further highlighted their evolving responsibilities in an increasingly digital academic landscape. The pandemic underscored the need for continuous technological advancements and professional development in librarianship, emphasizing that the future of academic libraries lies in their ability to integrate and innovate with emerging ICT solutions.

References:

- Aharony, N. (2011). Library and information science professionals' knowledge and use of Web 2.0 tools. *Journal of Librarianship and Information Science, 43*(1), 19-28. https://doi.org/10.1177/0961000610381417
- Al-Daihani, S. (2016). The role of academic libraries in supporting e-learning: A case study. *Journal of Librarianship and Information Science, 48*(1), 75-85. https://doi.org/10.1177/0961000614556206
- Ali, M. Y., &Gatiti, P. (2020). The COVID-19 (coronavirus) pandemic: Reflections on the roles of librarians and information professionals. *Health Information & Libraries Journal, 37*(2), 158-162. https://doi.org/10.1111/hir.12307
- Ameen, K., & Gorman, G. E. (2009). Information and digital literacy: A stumbling block to development? *Library Management, 30*(1/2), 99-112. https://doi.org/10.1108/01435120910927565
- Andrews, N. (2021). Digital transformation in academic libraries: Challenges and strategies. *Library & Information Science Research, 43*(4), 101095. https://doi.org/10.1016/j.lisr.2021.101095
- Baro, E. E., & Godfrey, V. Z. (2015). Web 2.0 tools and their applications in academic libraries: A survey of librarians in Africa. *The Electronic Library, 33*(2), 149-162. https://doi.org/10.1108/EL-09-2013-0171
- Bawden, D., & Robinson, L. (2020). The digital library and its users: Digital transformation of information access. *Aslib Journal of Information Management, 72*(3), 337-355. https://doi.org/10.1108/AJIM-03-2020-0063
- Bhardwaj, R. K. (2017). The role of digital libraries in enhancing research and scholarship. *Library Philosophy and Practice, 2017*, 1-12. https://digitalcommons.unl.edu/libphilprac/1490
- Borrego, Á. (2020). Remote access to library resources during the COVID-19 pandemic. *Information Development, 36*(4), 448-455. https://doi.org/10.1177/0266666920959700
- Biswas, Santanu (2015), "SarvaShikshaAbhiyan in the State of West Bengal: A General Study" Journal of Advances and Scholarly Researches in Allied Education (JASRAE), 9(18),
- Biswas, Santanu (2016), "Educational Dynamics in West Bengal: A Holistic Examination" Gurukul International Multidisciplinary Research Journal (GIMRJ), 6 (3), p.p. 319.
- Chowdhury, G. (2010). Introduction to digital libraries. *Facet Publishing*.
- Devchoudhary, A. (2007). Shifting from traditional to digital libraries: A strategic transformation. *Library Trends, 55*(4), 809-823.
- Fatima, N., & Ahmad, M. (2020). The impact of ICT on library and information science education and research. *Information and Learning Science, 121*(7/8), 511-529. https://doi.org/10.1108/ILS-07-2019-0077
- Gill, T. G. (2021). Cloud computing for academic libraries: Opportunities and challenges. *The Journal of Academic Librarianship, 47*(3), 102353. https://doi.org/10.1016/j.acalib.2021.102353
- Harinarayana, N. S., & Raju, N. V. (2010). Web 2.0 tools in academic libraries: A study of ARL libraries in the USA. *Electronic Library, 28*(1), 69-88. https://doi.org/10.1108/02640471011023388

- Islam, M. A., & Tsuji, K. (2016). Library adoption of social media: Current trends and future outlook. *The Electronic Library, 34*(3), 477-492. https://doi.org/10.1108/EL-05-2015-0085
- Johnson, N., Veletsianos, G., & Seaman, J. (2021). Online learning in the era of COVID-19: Shifts in digital engagement and academic library support. *Educational Review, 73*(4), 459-476. https://doi.org/10.1080/00131911.2021.1934567
- Khalid, K., & Pedersen, S. (2020). The changing role of librarians in digital transformation: A pandemic perspective. *Journal of Information Science, 46*(6), 713-728. https://doi.org/10.1177/0165551520937242
- Kumar, V., & Tripathi, R. C. (2021). Digital reference services: A review of trends and technological advancements. *Library & Information Science Research, 43*(2), 101041. https://doi.org/10.1016/j.lisr.2021.101041
- Kumari, Madhu and Biswas, Santanu (2023), "The Role of School Environment in Shaping Social Behaviors of Adolescents", International journal of Humanities, Engineering, Science and Management, 4(2), 27-41
- Lankes, R. D. (2016). The new librarian: Technology, policy, and the future of libraries. *MIT Press*.
- Luo, L., & Hostetler, K. (2020). The evolution of academic library services during the pandemic: Challenges and strategies. *College & Research Libraries, 81*(5), 650-672. https://doi.org/10.5860/crl.81.5.65.
- Nwosu, M. C. (2021). ICT tools and their role in remote learning during the COVID-19 crisis. *Library Philosophy and Practice, 2021*, 1-14. https://digitalcommons.unl.edu/libphilprac/4690
- O'Connor, S. (2019). Academic libraries and the digital divide: An emerging challenge. *Library Review, 68*(3), 200-216. https://doi.org/10.1108/LR-10-2018-0114
- Pomerantz, J. (2015). Metadata in academic libraries: Implications for digital services. *Library Trends, 64*(1), 3-27. https://doi.org/10.1353/lib.2015.0025
- Rowlands, I., & Nicholas, D. (2008). Understanding information behavior in digital environments: The case of academic libraries. *Journal of Documentation, 64*(3), 380-403. https://doi.org/10.1108/00220410810867566
- Shumaker, D. (2012). The embedded librarian: Innovative strategies for taking knowledge where it's needed. *Information Today, Inc.*
- Tenopir, C., & King, D. W. (2014). The role of academic libraries in the digital transformation of higher education. *The Journal of Academic Librarianship, 40*(6), 628-631. https://doi.org/10.1016/j.acalib.2014.10.002

Citation: **Suman. S. K.,** (2025) "ICT in Libraries : Ensuring Continuity of Academic Services During the Pandemic", *Bharati International Journal of Multidisciplinary Research & Development (BIJMRD)*, Vol-3, Issue-02, February-2025.