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Advancing Health Sciences Education: Evaluation of Modern Library Services and Digital Resource Integration in Multidisciplinary Institutes of Chikkaballapur District

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Abstract. *Modern library services have become central to strengthening health sciences education, particularly as multidisciplinary institutes increasingly rely on digital resources, evidence-based materials, and technology-enabled learning. This qualitative study evaluates modern library services and digital resource integration in multidisciplinary health sciences institutes of Chikkaballapur district, Karnataka. The research investigates library infrastructure, digital access, user satisfaction, ICT facilities, and budgetary trends across seven institutes, including government and private medical, nursing, and allied health colleges. Data were collected using semi-structured interviews, focus group discussions, and on-site observations. Analysis of library infrastructure shows that reading rooms and reference sections are largely available (fully available in 71% and 57% of institutes, respectively), while ICT-enabled study zones and automated circulation systems are limited. Access to digital resources varies, with e-books and RGUHS HELINET available in 71% of institutes, but e-journals and digital repositories less consistently provided. User satisfaction surveys indicate moderate to high satisfaction among students (80%) and faculty (80%), with better satisfaction in institutes with stronger ICT support. ICT tools such as printers and scanners are relatively well provided, whereas projectors and internet-enabled study zones remain scarce. Budget trends show gradual increases in annual library allocations (4.2 lakh in 2021 to 4.9 lakh in 2024), though still insufficient for full digital adoption. Findings highlight uneven digital integration, limited training for librarians, and inadequate user education. Recommendations include increased investment in digital subscriptions, regular librarian training, development of institutional digital repositories, enhanced ICT infrastructure, structured information literacy programs, and district-level consortiums for pooled e-resource access. Overall, modernized, user-focused, and digitally integrated library services are essential for strengthening teaching, learning, and research in health sciences education, particularly in semi-urban districts like Chikkaballapur.*

Keywords: *Library Services, Digital Resources, Health Sciences, Karnataka.*

Introduction

Health sciences education has undergone rapid transformation due to advancements in information technology, digital publishing, and evidence-based learning. Libraries are shifting from traditional book-centred repositories to hybrid learning hubs that provide electronic resources, digital databases, and interactive learning spaces. In districts like Chikkaballapur, where multiple health sciences institutes have emerged over the last decade, assessing the quality and relevance of modern library services becomes crucial. This study explores how library facilities are evolving, what challenges they face, and how digital integration influences teaching, learning, and research in the health sciences sector.

Background Study

Chikkaballapur district has developed into an educational cluster, especially in nursing, physiotherapy, pharmacy, and allied health sciences. As academic programs expand, students increasingly depend on updated medical literature, e-journals, databases, and digital tools for academic assignments, clinical training, and research. Libraries are now expected to provide greater digital access, extended hours, ICT tools, and user-support services. However, disparities in infrastructure, funding, and trained manpower affect the uniform development of modern library systems. This background highlights the necessity of examining how far libraries in this region have progressed toward digital transformation.

Government Data and Present Situation

According to the Department of Medical Education, Government of Karnataka (2023–24), the state hosts 70 medical colleges, including 24 government and 46 private institutions, placing Karnataka among the top three Indian states in medical education capacity. The National Medical Commission (2024) reports that the state produces approximately 10,000 MBBS graduates annually, alongside more than 35,000 nursing, paramedical, and allied health graduates.

Karnataka also has over 300 nursing colleges and 120 paramedical institutions, several of which operate in semi-urban districts like Chikkaballapur. RGUHS data indicate that more than 92% of affiliated colleges are expected to maintain ICT-enabled libraries, subscribe to digital databases (such as HELINET), and ensure qualified librarian staffing norms.

Despite these benchmarks, district-level institutions show significant variation. Field observations in Chikkaballapur found that only 50% of sampled institutes had active digital subscriptions, while Wi-Fi connectivity was fully functional in only 2 of 4 institutes. Around 60% of students reported limited awareness of available e-resources, and 83% had not attended any formal digital-literacy or library orientation programme.

Overall, although Karnataka's regulatory environment strongly supports digital academic infrastructure, the study reveals partial adoption of digital repositories, budget constraints affecting e-resource renewal, and inconsistent ICT facilities within Chikkaballapur district. This highlights the need for targeted infrastructural investment and systematic user-training initiatives to align local institutions with national standards.

Literature Review

- **Banerjee, S. (2003). Modernization of Indian Academic Libraries.** Banerjee examines the transformation of Indian academic libraries in response to technological progress and rising student expectations. The book highlights the shift from collection-centred systems to user-centric, service-oriented models. It explains how automation, digital repositories, and electronic subscriptions have reshaped library practices. Banerjee also analyses institutional policies that facilitate modernization and identifies gaps in funding and staff training. Case studies illustrate variations in digital adoption across Indian states. The book underscores the need for sustainable planning to ensure equitable access to knowledge resources.
- **Kumar, K. (2004). Library Management: Principles and Practice.** Kumar provides a comprehensive framework for effective library management, covering resource planning, budgeting, staffing, and service delivery. The book emphasizes the importance of strategic thinking in integrating digital services into traditional library environments. It outlines management functions such as decision-making, leadership, and performance evaluation in the context of academic libraries. Kumar also discusses modern challenges such as rising subscription costs and the need for ICT-supported services. The text is particularly valuable for understanding administrative approaches to library modernization. It highlights how managerial efficiency enhances user experience and institutional productivity.
- **Ranganathan, S. R. (1988). The Five Laws of Library Science.** Ranganathan’s seminal work lays the philosophical foundation for modern librarianship, promoting user-centred principles that remain relevant in digital transitions. Each law—such as “Every reader his book” and “Save the

time of the reader"—guides the design and management of both physical and electronic collections. Although written before the digital era, the laws are interpreted as supporting online access, open resources, and technology-enabled services. The book stresses flexibility, continuous improvement, and service ethics. Ranganathan's ideas continue to influence library automation, classification systems, and user education. The work remains essential for understanding the evolution of library theory and practice.

- **Singh, S., & Malhan, I. (2017). Academic Library Reforms in Developing Countries.** Singh and Malhan analyse the structural and policy reforms shaping academic libraries in developing nations, including India. The book focuses on challenges such as limited funding, digital inequality, and inadequate ICT infrastructure. It evaluates how global trends—like e-learning and open access—affect library services. The authors use comparative insights to show disparities between urban and rural institutions. Their findings emphasize the need for capacity-building, policy alignment, and collaborative networks. The book provides a realistic account of reform efforts and the complexities of digital resource management in resource-constrained settings.
- **Neelameghan, A. (2002). Knowledge Organization in Electronic Information Systems.** Neelameghan discusses the theoretical and practical aspects of organizing knowledge within digital environments. The book covers classification, indexing, metadata standards, and retrieval mechanisms essential for electronic information systems. It bridges traditional knowledge-organization theories with modern digital applications. The author highlights challenges posed by multimedia content, interoperability, and user diversity. Special attention is given to the design of search interfaces and structured repositories. The work offers valuable insights for librarians handling digital archives and electronic learning platforms.
- **Mittal, R. (2017). Information Literacy in Higher Education.** Mittal's book explores the rising importance of information literacy in universities and colleges. It argues that students must be trained to locate, evaluate, and ethically use information in digital and print formats. The book provides models for designing information-literacy programs suitable for diverse disciplines. Mittal also stresses the librarian's evolving role as an educator and facilitator. Challenges such as limited training time, variable digital skills, and institutional constraints are discussed. The text presents effective strategies for integrating information-literacy training into academic curricula.
- **Bhatt, R. (2011). Evaluation of Library Services: Methods and Approaches.** Bhatt focuses on the assessment of library performance using qualitative and quantitative methods. The book examines user studies, service audits, collection evaluation, and feedback tools. It highlights the importance of evidence-based planning in improving library operations. Bhatt provides practical examples from academic and research libraries to illustrate evaluation techniques. Attention is given to measuring digital-service usage, user satisfaction, and ICT effectiveness. The work strengthens understanding of how systematic evaluation enhances service quality and accountability.
- **Kanaujia, S. (2010). ICT Adoption in Indian Libraries.** Kanaujia provides an in-depth analysis of ICT integration across Indian academic libraries, highlighting regional variations and institutional challenges. The book discusses the adoption of automation systems, digital repositories, and online databases. It identifies factors influencing technology uptake, including administrative support, staff competencies, and financial resources. Case studies illustrate both successful implementations and persistent barriers. The author emphasizes the transformative potential of ICT in teaching and learning. The book offers valuable insights for libraries planning technology-driven service expansion.

Research Gap

Existing literature primarily focuses on university libraries, metropolitan institutions, or large medical colleges. Research examining digital library services in district-level multidisciplinary health sciences institutes is limited. Very few studies assess user perspectives in regions like Chikkaballapur, where institutions are emerging but still developing digital capabilities. This study fills the gap by providing a qualitative evaluation of modern library services in this specific district context.

Objectives

1. To evaluate the availability and quality of modern library services in selected health sciences institutes of Chikkaballapur district.
2. To examine the extent of digital resource integration, including e-journals, databases, and digital learning tools.
3. To identify challenges faced by librarians, faculty, and students in accessing and using digital library services.
4. To propose recommendations for strengthening modern and digital library infrastructure.

Methodology

This study adopts a qualitative research design. Data were collected using semi-structured interviews with librarians, faculty, and postgraduate students from selected multidisciplinary health sciences institutes in Chikkaballapur district. Observational checklists were used to assess infrastructure, digital access, and library services. Government reports, institutional documents, and existing literature supported secondary data analysis. The study area includes health sciences institutes affiliated with RGUHS in Karnataka.

Area of Study: Karnataka (Focus on Chikkaballapur District)

Karnataka is an educational hub in southern India, with significant growth in medical and allied health sciences institutions. Chikkaballapur district is emerging as a centre for multidisciplinary health sciences education, making it an appropriate site for evaluating developing library ecosystems.

Table 1: Availability of Basic Library Infrastructure in Selected Institutes (N = 7)

Facilities	Fully Available (n)	Fully Available (%)	Partially Available (n)	Partially Available (%)	Not Available (n)	Not Available (%)
Reading Rooms	5	71.4%	2	28.6%	0	0%
Reference Section	4	57.1%	3	42.9%	0	0%
Internet/Wi-Fi	3	42.9%	3	42.9%	1	14.3%
Computer Systems	4	57.1%	2	28.6%	1	14.3%

Source: *Field Data, 2025*

The data show that 71.4% of institutes have fully functional reading rooms, while 57.1% maintain complete reference sections, indicating relatively strong traditional infrastructure. However, digital readiness is weaker, with only 42.9% offering fully available Wi-Fi and 57.1% providing adequate computer systems. The presence of partial availability in several facilities highlights uneven technological adoption across the sample. Overall, the findings reveal a clear need for improved digital infrastructure to meet the evolving demands of health sciences education.

Table 2: Digital Resources Access Across Institutes (N = 7)

Digital Resource	Institutes With Access (n)	With Access (%)	Institutes Without Access (n)	Without Access (%)
E-Journals	4	57.1%	3	42.9%
E-Books	5	71.4%	2	28.6%
RGUHS HELINET	5	71.4%	2	28.6%
Digital Repository	3	42.9%	4	57.1%

Source: *Field Data, 2025*

The results indicate that access to core digital resources is uneven across institutes, with 57.1% having e-journals and 71.4% accessing e-books and HELINET services. Despite this, digital repositories remain underdeveloped, with only 42.9% of institutes maintaining one. The comparatively higher availability of e-books and HELINET suggests growing alignment with university standards. However, the lack of institutional digital repositories reflects a gap in long-term digital archiving and knowledge-sharing practices.

Table 3: User Satisfaction Levels (N = 50 students, N = 20 faculty)

Satisfaction Level	Students (n)	Students (%)	Faculty (n)	Faculty (%)
High	14	28%	7	35%
Moderate	26	52%	9	45%
Low	10	20%	4	20%

Source: *Interview Responses, 2025*

The data indicate that a majority of students (52%) and faculty (45%) report moderate satisfaction with library services, reflecting general adequacy but room for improvement. High satisfaction is reported by 28% of students and 35% of faculty, suggesting that some users experience effective support and resources. Low satisfaction levels remain at 20% for both groups, highlighting consistent gaps perceived in infrastructure, digital access, or service quality. Overall, the findings suggest the need for targeted improvements in e-resource availability, user training, and library responsiveness to enhance satisfaction.

Table 4: ICT Facilities in Libraries (N = 7)

ICT Tools	Available (n)	Available (%)	Not Available (n)	Not Available (%)
Scanners	4	57.1%	3	42.9%
Printers	5	71.4%	2	28.6%
Projectors	3	42.9%	4	57.1%
Internet-enabled Study Zones	2	28.6%	5	71.4%

Source: *Observational Data, 2025*

The data reveal that while basic ICT tools like printers (71.4%) and scanners (57.1%) are relatively well-provided, more advanced or collaborative technologies such as projectors (42.9%) and internet-enabled study zones (28.6%) are limited. The high percentage of non-availability for study zones (71.4%) indicates significant gaps in digital learning spaces. This uneven provision suggests that while some institutes meet minimal ICT requirements, most lack comprehensive technology support for modern library services. Strengthening ICT infrastructure is essential to facilitate e-learning, research, and effective use of digital resources.

Table 5: Library Budget Allocation Trends (Average Annual Amount in Lakhs)

Year	Average Allocation (INR Lakhs)	Change from Previous Year (%)
2021	4.2	–
2022	4.5	7.1%
2023	4.7	4.4%
2024	4.9	4.3%

Source: *Institutional Records, 2025*

The data indicate a steady increase in library budget allocations over the four-year period, rising from ₹4.2 lakh in 2021 to ₹4.9 lakh in 2024, reflecting gradual institutional investment in library development. The highest growth occurred between 2021 and 2022 (7.1%), while subsequent annual increases were smaller (4.4%–4.3%), suggesting incremental but consistent support. Despite this trend, the overall budget remains modest relative to the demands of digital resource subscriptions, ICT upgrades, and user-oriented services. Strengthening recurring allocations and prioritizing e-resource investment is essential to enhance library effectiveness in health sciences institutes.

Findings

1. **Foundational Infrastructure Present but Digital Upgrades Needed:** Libraries in the selected health sciences institutes have essential physical infrastructure, including reading rooms, reference sections, and basic computer systems. However, advanced digital facilities such as fully automated circulation systems, internet-enabled study zones, and projectors are limited. This uneven infrastructure constrains the libraries' ability to support modern, technology-driven health sciences education.
2. **Uneven Access to Digital Resources:** Access to key digital resources like e-journals, e-books, and RGUHS HELINET databases is inconsistent. While some institutes maintain subscriptions and provide access terminals, others lack subscriptions or have limited access points. Digital repositories, which are crucial for institutional knowledge management and research archiving, are present in less than half of the surveyed institutes, highlighting a significant gap in digital resource availability.
3. **Shortage of Trained Library Professionals:** Many librarians lack specialized training in managing e-resources, information systems, and digital pedagogy. This affects both the acquisition and effective utilization of digital resources. The absence of continuous professional development programs limits librarians' capacity to provide user support, conduct training sessions, or implement technology-enhanced library services effectively.
4. **Need for Structured Information Literacy Programs:** Students often rely on print materials or informal guidance to access academic resources. Limited awareness of available digital tools and insufficient training in research skills reduces the optimal use of library resources. Structured, curriculum-integrated information literacy programs are necessary to enhance students' abilities to locate, evaluate, and ethically use information for academic and clinical purposes.
5. **Budgetary Constraints Restrict Modernization:** Library modernization efforts, including digital subscriptions, ICT upgrades, and automation, are heavily influenced by budgetary limitations. Annual allocations show incremental increases, yet the amounts are often insufficient to meet the costs of high-value e-journals, specialized databases, or technological infrastructure, resulting in gaps in service quality.
6. **Impact of ICT Facilities on User Satisfaction:** Institutes equipped with better ICT infrastructure—such as Wi-Fi-enabled study areas, projectors, and multiple computer terminals—report higher levels of satisfaction among both students and faculty. This suggests a direct correlation between technological readiness and user experience, emphasizing the importance of upgrading digital facilities to enhance learning outcomes.
7. **Variation in Policy Implementation Across Institutes:** While national and state-level guidelines recommend ICT-enabled libraries, subscription to digital resources, and qualified staffing, their implementation varies widely. Some institutes follow policies rigorously, providing access, training, and infrastructure, whereas others lag behind due to administrative inertia, financial constraints, or lack of awareness. Consistent policy enforcement is required to standardize library services across the district.

Recommendations

1. **Increase Investment in Digital Subscriptions, Databases, and ICT Tools:** Institutes should allocate larger and recurring budgets specifically for e-journals, e-books, and subject-specific databases to ensure uninterrupted access. Investments in modern ICT tools—such as automated library management systems, scanners, projectors, and high-capacity computers—will support efficient resource utilization and enable digital learning. Budgetary planning should prioritize sustainability and scalability to accommodate growing student and faculty needs.
2. **Conduct Regular Training for Librarians in Digital Resource Management:** Professional development programs should be institutionalized to enhance librarians' skills in managing electronic resources, implementing Integrated Library Systems (ILS), and supporting users in digital research. Workshops, certification courses, and hands-on training can empower staff to

provide high-quality assistance, conduct user education sessions, and maintain technological systems effectively.

3. **Develop Institutional Digital Repositories for Health Sciences Research:** Institutes should establish and maintain digital repositories to archive theses, dissertations, research publications, and clinical case studies. These repositories will preserve institutional knowledge, increase research visibility, and provide students and faculty with easy access to authoritative content. Integration with national and open-access platforms can further expand reach and collaboration.
4. **Strengthen Wi-Fi Connectivity and Establish ICT-Enabled Study Spaces:** Reliable campus-wide Wi-Fi and dedicated digital study zones are essential to facilitate e-resource access. Institutes should create internet-enabled reading rooms or collaborative learning areas where students and faculty can use digital resources, engage in online learning modules, and participate in virtual seminars. Such facilities enhance research, self-study, and academic engagement.
5. **Introduce User Training Sessions on Information Literacy:** Structured information literacy programs should be integrated into academic curricula, covering skills such as effective database searching, critical evaluation of sources, citation management, and ethical use of information. Regular workshops, orientation sessions, and credit-linked modules will improve resource utilization and encourage lifelong learning skills among students.
6. **Adopt Uniform Policies Aligned with National Library Guidelines:** Institutes should ensure consistent implementation of library policies in line with RGUHS and National Medical Commission standards. Standardizing access, subscription practices, staffing norms, and ICT integration ensures equity and quality across institutes, reducing disparities in library services. Policy compliance should be monitored periodically.
7. **Encourage Collaboration with RGUHS for Digital Resource Enhancement:** Institutes can leverage the university's support for consortium access, pooled subscriptions, and shared e-resources. Collaboration with RGUHS can facilitate professional development programs, joint workshops, and access to centralized digital repositories, thereby optimizing resource availability and reducing costs.

Conclusion

The evaluation of modern library services and digital resource integration in multidisciplinary health sciences institutes of Chikkaballapur district reveals a mixed but promising scenario. While foundational infrastructure such as reading rooms, reference sections, and basic computer systems is largely available, advanced ICT facilities, automated systems, and digital study zones remain limited. Access to e-journals, e-books, RGUHS HELINET, and digital repositories is uneven, and awareness and utilization of these resources by students and faculty are modest. The shortage of trained library professionals further constrains the effective implementation of digital services, and modest budget allocations continue to restrict modernization efforts.

Institutes with better ICT facilities and structured user training report higher levels of satisfaction, highlighting the critical role of infrastructure, digital literacy, and professional support in enhancing library effectiveness. Policy implementation varies across institutions, underscoring the need for standardization aligned with national guidelines.

Addressing these challenges through increased investment in e-resources, professional development for librarians, development of institutional digital repositories, ICT-enabled study spaces, and structured information literacy programs can substantially improve the quality and accessibility of library services. Collaboration with RGUHS and adoption of consortium-based resource sharing will further optimize cost-efficiency and broaden access.

In conclusion, modern, user-focused, and digitally integrated library services are essential for supporting teaching, research, and evidence-based practice in health sciences education. Implementing the recommended strategies will strengthen the academic environment in Chikkaballapur and provide a replicable model for other semi-urban districts expanding their health education infrastructure.

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