INFORMATION AND COMMUNICATION TECHNOLOGY AND ITS IMPACT ON LIBRARY RESOURCES AND SERVICES IN ENGINEERING INSTITUTIONS

MALOTHU BALAKRISHNA
Research Scholar
Department of Library and Information sciences, Osmania University, Hyderabad.
malothubalakrishna@gmail.com

Dr. J. VIVEKAVARDHAN
Head and Chairman Board of Studies
Department of Library and Information Science
Osmania University, Hyderabad.

Abstract

Information and Communication Technology (ICT) has brought significant changes to the functioning of academic libraries, particularly in engineering institutions. The rapid development of digital technologies has transformed traditional library resources and services into technology-driven, user-oriented, and easily accessible information systems. Engineering college libraries increasingly use ICT applications such as library automation software, online public access catalogues (OPAC), electronic journals, e-books, institutional repositories, digital libraries, online databases, RFID, barcode technology, remote access services, and virtual reference services to meet the changing information requirements of students, faculty members, and researchers. The present study examines the use and impact of ICT on library resources and services in engineering institutions. It focuses on the role of ICT in improving accessibility, availability, efficiency, speed, accuracy, and quality of library services. The study also highlights the contribution of ICT to teaching, learning, research, and academic communication. Further, it identifies major challenges associated with ICT adoption, including inadequate infrastructure, limited financial resources, lack of technical skills, connectivity problems, maintenance costs, and the need for continuous training of library professionals and users. The study concludes that effective integration of ICT can significantly enhance the quality and effectiveness of library resources and services in engineering institutions. Strengthening ICT infrastructure, providing continuous professional development, and promoting digital literacy are essential for developing modern, efficient, and user-centred engineering college libraries.

Keywords: *Information and Communication Technology (ICT), Engineering College Libraries, Library Resources, Library Services, Library Automation, E-Resources, Digital Libraries, OPAC, ICT Applications.*

1. Introduction

Information and Communication Technology (ICT) has become an essential component of modern academic and educational environments. The rapid advancement of computers, the Internet, digital communication, cloud technologies, mobile devices, and online information systems has fundamentally changed the way information is created, organized, accessed, disseminated, and used. Libraries, which have traditionally served as major centres for collecting, organizing, preserving, and providing access to information, are also undergoing substantial transformation due to the development of ICT.

Engineering education is strongly dependent on current, accurate, and rapidly changing information. Students, teachers, researchers, and technical professionals require access to textbooks, reference materials, scholarly journals, conference proceedings, standards, patents, technical reports, databases, e-books, and other electronic information resources. Traditional print-based library collections alone are often insufficient to satisfy these diverse and rapidly changing information requirements. Consequently, engineering institution libraries are increasingly adopting ICT to provide wider access to both print and electronic resources.

The application of ICT has transformed conventional libraries into automated and digitally enabled information centres. Library automation systems have simplified routine activities such as acquisition, cataloguing, classification, circulation, serials control, and stock verification. Online Public Access Catalogues (OPACs) enable users to search library collections quickly and efficiently. Electronic resources such as e-books, e-journals, online databases, digital repositories, and open educational resources have expanded the scope of information available to library users beyond the physical boundaries of the library.

ICT has also improved the delivery of library services. Services such as online renewal, reservation of books, email alerts, selective dissemination of information (SDI), current awareness services (CAS), digital reference services, remote access, institutional repositories, and mobile-based library services provide users with greater flexibility and convenience. Users can access many information resources from laboratories, classrooms, hostels, homes, or other locations through Internet-enabled devices.

In this context, studying the use and impact of ICT on library resources and services is important for understanding how engineering institution libraries are responding to the changing information environment. The present article examines the role of ICT in transforming library resources and services in engineering institutions and discusses its contribution to improving access to information, supporting teaching and learning, facilitating research, and enhancing overall library effectiveness. It also considers the major challenges faced by engineering institution libraries in adopting ICT and suggests the need for appropriate strategies to strengthen ICT-enabled library services.

REVIEW OF RELATED LITERATURE

1. **Kumar & Kumar (2026)** the study entitled that "*An assessment of library automation and ICT-based services in college libraries affiliated to Kuvempu University, India"*. The study found that college libraries have adopted automation software and ICT-based services, though institutions still face challenges due to limited resources and technical support. The study recommended that ICT plays a vital role in improving library services, but the extent of adoption varies across institutions.
2. **Wilson & Ofori (2026)** the study entitled as *"Role of Information and Communication Technology in Transforming Academic Libraries",* the authors argue that ICT has shifted libraries from print-centric collections to integrated digital environments supporting e-learning, remote access, and interdisciplinary services. They also note that ICT adoption is uneven across regions. The study recommends integrating ICT with teaching and research, and recruiting digitally-literate library professionals.
3. **Ge and Liu (2026)** the study entitled as "Digital technology–mediated engagement and the formation of complex capabilities in undergraduate engineering students" found that digital technology helps undergraduate engineering students actively engage with learning tasks and respond to technological challenges. The study showed that ICT supports the development of problem-solving, adaptability, judgment, and other higher-level engineering capabilities. The authors recommended integrating digital technologies into engineering learning environments to promote meaningful student engagement. They also emphasized providing appropriate guidance and support to help students use digital technologies effectively.
4. **Abhishek K (2025)** in their study entitled as *"Use of Information Communication Technology (ICT) In Library: An Overview"* found that ICT has significantly transformed traditional library operations and services by improving automation, accessibility, efficiency, and user services. The study highlighted the importance of digital resources, RFID, QR codes, remote access, and

institutional repositories. It recommended that libraries should adopt modern ICT tools, upgrade technological infrastructure, and provide regular ICT training to library professionals to meet changing user needs.

2. Need for the Study

The rapid growth of Information and Communication Technology (ICT) has brought fundamental changes in the nature, organization, management, and delivery of library resources and services. Engineering institutions, in particular, require continuous access to current and specialized information because engineering education and research depend heavily on rapidly developing scientific and technological knowledge. Conventional print-based resources and manually operated library services alone may not adequately satisfy the growing and diverse information requirements of students, faculty members, researchers, and other academic users.

The introduction of ICT has enabled engineering institution libraries to provide access to a wide range of electronic information resources, including e-books, e-journals, online databases, digital repositories, technical reports, standards, patents, conference proceedings, and open-access resources. Library automation has also improved routine activities such as acquisition, cataloguing, classification, circulation, serials control, and stock verification. Online Public Access Catalogue (OPAC), Web OPAC, remote access, email alerts, current awareness services, selective dissemination of information, and digital reference services have made library services faster and more convenient.

3. Statement of the Problem

The emergence of ICT has transformed traditional libraries into automated and digitally enabled information centres. Engineering institution libraries are increasingly adopting ICT-based systems to meet the changing information requirements of students, faculty members, researchers, and other users. However, the availability of ICT facilities does not necessarily ensure their effective utilization.

4. Scope of the Study

The scope of the present study is confined to the use and impact of Information and Communication Technology on library resources and services in selected engineering institutions. The study focuses primarily on the technological facilities available in engineering institution libraries and their utilization by students, faculty members, researchers, and library professionals.

5. Major Library Resources in Engineering Institutions

Engineering institution libraries provide a combination of traditional and electronic resources to support teaching, learning, research, innovation, and professional development.

- **Textbooks**
- **Reference Resources**
- **E-Books**
- **E-Journals**
- **Online Databases**

- **Conference Proceedings**
- **Technical Reports**
- **Standards and Specifications**
- **Patents**
- **Institutional Repositories**
- **Digital Library Resources**
- **Open Educational Resources**
- **Major Library Services in Engineering Institutions**
- **Library Automation Services**
- **Online Public Access Catalogue (OPAC)**
- **Circulation Services**
- **Current Awareness Service (CAS)**
- **Selective Dissemination of Information (SDI)**
- **Digital Reference Service**
- **Document Delivery Service**
- **Internet and Wi-Fi Services**
- **Remote Access Services**
- **Institutional Repository Services**
- **User Orientation and Information Literacy Services**
- **Reference and Research Support Services**

7. Impact of ICT on Library Resources and Services

The implementation of ICT has produced significant positive changes in engineering institution libraries. First, it has increased the availability and accessibility of information resources by enabling users to access electronic resources beyond the physical boundaries of the library. Second, ICT has increased the speed and efficiency of information retrieval, allowing users to identify relevant information within a short period.

Third, ICT has improved the quality and diversity of library collections by providing access to international journals, databases, e-books, technical standards, conference proceedings, patents, and other specialized resources. Fourth, automation has reduced repetitive manual work and improved the accuracy and efficiency of library housekeeping operations.

ICT has also strengthened support for teaching, learning, and research. Students and faculty members can access current scholarly literature, conduct literature searches, communicate with researchers, and use online academic resources more effectively. Remote access has further increased the flexibility and convenience of library services.

However, the impact of ICT is also associated with certain challenges. These include inadequate ICT infrastructure, high subscription costs for electronic resources, insufficient technical staff, lack of user training, Internet connectivity problems, cybersecurity concerns, copyright issues, and the need for continuous updating of hardware, software, and professional skills. Effective ICT implementation therefore requires adequate financial support, infrastructure, skilled personnel, regular training, and institutional planning.

8. Conclusion

Information and Communication Technology has become an essential component of modern engineering institution libraries. The integration of ICT has transformed traditional library resources and services into more accessible, efficient, flexible, and user-oriented systems. Electronic resources, library automation, OPAC/Web OPAC, digital libraries, institutional repositories, online databases, remote access, and digital reference services have significantly expanded the ability of engineering libraries to support academic and research activities.

In conclusion, ICT is not merely a technological addition to engineering institution libraries; it is a major instrument for transforming the library into a modern academic knowledge centre. Proper planning, investment, professional development, and user-oriented approaches can ensure that ICT-enabled library resources and services effectively contribute to the educational, research, and innovation objectives of engineering institutions.

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