

Mobile-Based Applications for Enhancing Library Services in Select Indian Institutes of Technology (IITs) Libraries in North-India

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Abstract

The proliferation of mobile applications has introduced challenges in providing seamless access to online information. This study focuses on the status of mobile applications in IIT libraries and evaluates their role in enhancing library services to meet users' immediate information needs. Employing a survey method, a structured questionnaire was distributed to five librarians, yielding a 100% response rate. The study analyses the responses through descriptive statistics, presenting findings in tables.

Results indicate a fragmentation in the use of mobile applications to augment library services, despite a high demand for improved service delivery. While IIT libraries universally offer Wi-Fi facilities (100%), only 80% provide limited mobile-based services, such as email alerts, database accessibility, Ask-a-Librarian and mobile-responsive websites. The study identifies challenges, including a shortage of skilled manpower (60%), insufficient support from institute authorities (60%) and a lack of a Mobile-based Library Services Policy (40%), hindering the implementation of mobile library services and maximising return on investment (ROI).

The research recommends that libraries design and develop mobile apps to enhance service delivery, addressing shortcomings in existing mobile library apps, MOPAC and mobile library instructions. This study is significant as one of the first to investigate the current usage of mobile technology and services in IIT libraries, shedding light on their early stages. It emphasises the potential effectiveness of mobile

applications in libraries when library and information science professionals actively advocate for their implementation, facilitating instant access and discovery of library resources on users' mobile devices.

Keywords: Mobile Technologies, Mobile-Based Library, Mobile-Based Library Services, IIT Libraries, Libraries-India

Introduction

Using mobile technologies creates a new way to enhance connections between users and libraries to use library services effectively. Mobile application design and development for libraries helps meet the instant need for real-time, mobile-accessible information. It enables immobility using mobile devices such as smartphones, PDAs and tablets. There are two types of mobile-based library services: those made specifically for mobile devices and those adapted to be accessible via mobile devices.

Indian Institutes of Technology: An Overview

The Indian Institutes of Technology (IITs) are known as prominent public technical institutes, and they are centralised and funded by the Ministry of Human Resources Development, Government of India. Currently, 23 Indian Institutes of Technology (IITs) are located at several locations across the country. The Ministry of

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Education, Government of India passed the Indian Institute of Technology Act 1961 to govern the Institutes of National Significance. Since 1961 Indian Institutes of Technology have been classified and recognised as “Institutes of Importance”.

Literature Review

Mobile-based applications in libraries help to faster deliver library services to users on their mobile devices around the globe. Some of the previous studies relating to the present study are a recent study by (Yi, Barun & Donghun, 2022). Proposed a model for mobile curation services in academic libraries and described the concept of content curation using mobile technologies to fulfil the user’s information needs. In another study attesting to the above, Beg, Khan and Anjum (2022) reveals future research for dynamic researchers to investigate the mobile app recommendation domain research. St Patrick’s (2021) explores mobile services “to enhance the usage of library collections and services from good to greater and provides best practices for implementing mobile library services in academic libraries”.

Digital services are rendered through digital platforms via mobile applications. Izuagbe, Ifijeh and Ilo (2021) identified digital platforms for library services as Telegram, WhatsApp, YouTube, Zoom, Messenger and Google Classroom. In line with this, Nasir reported that academic libraries in Malaysia render digital services through Chat services (Library WhatsApp group). Jumah and Dar (2019) “examines the academic library users’ needs for mobile-based services and the competence of libraries to provide services on the go”. Chaputula and Mutula (2018) reveal that libraries must MOPAC, mobile websites, SMS notifications and access e-resources on mobile devices.

Another study by Madhusudhan and Dar (2017) explored “the mobile library services initiated and adopted by university libraries for quickly mobilising the library services as a new way of information delivery”. Maghribi, Osman and Zainal (2017) attempted a few insights to set up and implement a web-based system with mobile SMS technology to enhance library services. Anbu K. and Kataria (2017) introduced mobile applications for the library at UNISWA library to effectively deliver

information service on users’ mobile devices over the internet.

Nalluri and Gaddam (2016) described the practical strategies for mobilising libraries with mobile devices and mobile tools and their applications in libraries, especially academic promotion. Swogger and Linares (2016) defined the inherent challenges in their study of BrowZine to developing and marketing mobile apps to library users. Bondarenko (2020) describes the applications of QR codes in libraries for marketing library services and products. For several uses, he has explored QR codes in two categories, dynamic and static. He observed that prospect of QR-coding technology as a type of mobile service in libraries from the point of view of cost-effective digital marketing means of communication is substantiated around the globe. Liu and Briggs (2015) observed that “the most common mobile services offer mobile websites, text messaging services, e-books/journals, mobile-accessible databases and Mobile OPAC”.

Malathy and Kantha (2013) discussed “the application of mobile technology in libraries to provide ubiquitous, user-friendly, dynamic, personalized, and up-to-date information services to library users”. Wilson (2013) describes practical approaches to creating mobile apps for university libraries to deliver library services using mobile applications.

Saeidnia et al. (2023) explored the designing and development of mobile library apps in Android Studio environment using the Java script, and implemented for library services at Tarbiat Modares University, Iran. They observed that mobile apps development using this method to be cost-effective for efficiently delivery of library services in the developing country.

The literature demonstrates the significance of establishing mobile-based library services. To immediately improve library services and meet library users’ information needs, a study was required to ascertain the current state of mobile-based applications in IIT libraries in India. Hence, this study fills the gap in the literature.

Significance of the Study

The incredible revolution of information management and dissemination from print to digital and the outlook

of information services from web-based services to mobile-based services in the mobile world open the door for accessing information anywhere, anytime and on any device. Now, mobile-based applications in libraries have paved new ways of information delivery to satisfy user information needs instantly. This adoption of mobile applications in libraries by LIS professionals is beneficial to meeting the instant information needs of library users anywhere, anytime. These days, libraries can instantly use mobile applications and cutting-edge technology to deliver and improve library services through networks. The study's main objective is to find mobile-based applications in library services in select IIT libraries in North India. This study assesses the abilities that IIT librarians should develop to convert to providing services on m-tech platforms.

Objectives of Study

The primary objectives of this study are:

- To determine the status of mobile-based library services in select IIT libraries in North India.
- To find enhanced services from web-based to mobile-based library services, and

- To identify the challenges in adopting mobile-based library services in select IIT libraries.

Scope and Methodology of the Study

The scope of the study was restricted to five (5) IIT libraries in India (IIT Kanpur, IIT Delhi, IIT Roorkee, IIT Ropar and IIT Mandi) (Table 1). The selection of studied libraries' were based on functional mobile-based applications that provide library services on users' mobile devices.

The *Survey method* was adopted using a well-designed questionnaire. A web form was also created using "Google Forms" as an online tool to collect information from the studied libraries. The questionnaire was designed to elicit respondents' experiences with mobile-based library services and divided into three sections, (i) Status of Mobile-Based Applications, (ii) Enhancement of Library Services and (iii) problems in implementing mobile-based library services. The questionnaire was circulated personally among five librarians in March 2023, and received all duly filled-in questionnaires, eliciting a response rate of 100%. The responses received from the respondents were analysed with the help of descriptive statistics and presented in tables.

Table 1: List of Participating in IIT Libraries in India

Sr. No.	Name of Institution	Estd. Year	Name of Library	Library Website
1.	Indian Institute of Technology Kanpur	1959	"P. K. Kelkar Library"	https://pkklib.iitk.ac.in/
2.	Indian Institute of Technology Delhi	1961	"Central Library"	https://library.iitd.ac.in/
3.	Indian Institute of Technology Roorkee	2001	"Mahatma Gandhi Central Library"	https://mgcl.iitr.ac.in/
4.	Indian Institute of Technology Ropar	2008	"Central Library"	https://www.iitrpr.ac.in/library/
5.	Indian Institute of Technology Mandi	2009	"Central Library"	http://library.iitmandi.ac.in/

Data Analysis and Interpretation

IIT libraries have re-designed library services with mobile and social media apps for faster communication and information delivery on users' mobile devices.

Status of Mobile-Based Library Services

The status of mobile-based applications in IIT libraries in North India is presented in Table 2.

Table 2: Status of Mobile-Based Library Services (N=5)

Sr. No.	Particulars	No. of Responses (%)
1.	Wi-fi Service for Internet Connectivity	5 (100%)
2.	Email Alerts	4 (80%)
3.	Database Searching Service	4 (80%)
4.	E-resources remote Accessibility	4 (80%)
5.	Ask a Librarian	4 (80%)

Sr. No.	Particulars	No. of Responses (%)
6.	Mobile Library Website	4 (80%)
7.	SMS/MMS Notifications Service	3 (60%)
8.	Digital Library Service	3 (60%)
9.	QR Code enables Services	3 (60%)
10.	Mobile OPAC	2 (40%)
11.	Digital reference services	2 (40%)
12.	Online Information Literacy Service	2 (40%)
13.	Referral Service	1 (20%)
14.	Abstracting Service	1 (20%)
15.	Bibliographic and literature	1 (20%)
16.	Document Delivery (File sharing)	1 (20%)
17.	Current Awareness Service	1 (20%)
18.	Online Chat Services	1 (20%)

Note: Multiple responses are allowed.

Table 2 reveals that cent per cent of studied libraries provide Wi-Fi services, followed by most of the libraries (80%) giving email alerts, Ask-a-Librarian services, database searching services and mobile library website services to their users. And 60% of studied libraries provide SMS notifications, digital library services, and QR code-enabled services. Meanwhile, 40% of libraries offer digital reference services, online information literacy services, and MOPAC facilities. Interestingly, the most minor (20%) mobile-based library services are referral, abstracting, bibliography and literature, document delivery, current awareness and online chat services.

Enhancement of Library Services

The mobile-based applications help to improve library services and shift web-based library services into Mobile library services that provide access to internet information in mobile-accessible formats, enabling learning opportunities everywhere and anytime and facilitating bring-your-own-device (BYOD) practice (Table 3).

Table 3: Enhancement of Library Services

Sr. No.	Particulars	No. of Responses (%)
1.	Databases to Mobile databases	3 (60%)
2.	Barcode Applications to Quick Response Code Applications	3 (60%)

Sr. No.	Particulars	No. of Responses (%)
3.	Traditional Reference Services to Mobile-Based Reference Services	3 (60%)
4.	Library Tours to Mobile Library Tours	3 (60%)
5.	Contact Librarian to Real-Time Ask-a-Librarian	3 (60%)
6.	Hyperlinks to Library Apps	3 (60%)
7.	Library collection to Mobile library resources	2 (40%)
8.	Library website to Mobile library website/Responsive webpage	2 (40%)
9.	Circulation services to Mobile based documents renewal/Reservation services	2 (40%)
10.	Email alerts to Mobile Notifications/SMS	2 (40%)
11.	Computer printing to Mobile printing	2 (40%)
12.	Library fee cash receipt to Online receipt using Mobile App	2 (40%)
13.	Call number to Location	2 (40%)
14.	Web OPAC to MOPAC	1 (20%)
15.	Library Instructions to Mobile Library Instructions	1 (20%)
16.	Print documents delivery to Mobile file sharing	1 (20%)
17.	Print Maps to Mobile Library Maps	1 (20%)

Note: Multiple responses are allowed.

Table 3 indicates that the top three (60%) enhanced library services out of five are databases to mobile databases, barcode to quick response code, traditional reference services to mobile-based reference services, library tours to mobile library tours, contact librarian to real-time ask-a-librarian and hyperlinks to library Apps. And 40% of libraries enhanced their services from library collection to mobile library resources, library website to mobile library website, circulation services to mobile-based document renewal/reservation services, email alerts to mobile notifications or SMS, computer printing to mobile printing, library fee cash receipt to online receipt using a mobile App and called the number to location.

However, 20% of studied libraries enhanced their library services from Web OPAC to MOPAC, library instructions to mobile library instructions, print document delivery to mobile file sharing and print maps to mobile library maps.

Problems/Challenges in Implementing Mobile-Based Services

The difficulty confronting IIT libraries is developing appealing information services, and the mobile revolution presents both opportunities and challenges. There are many problems in implementing mobile-based services, but this study has identified the five major problems in IIT libraries to enhance library services in the mobile world (Table 4).

Table 4: Problems/Challenges in Implementing Mobile-Based Library Services (N=5)

Sr. No.	Problems	No. of Responses (%)
1	Institute authorities support	3 (60%)
2	Skilled Manpower	3 (60%)
3	Mobile-based Library Services Policy	2 (40%)
4	Cooperation from Computer Center	1 (20%)
5	Poor Wi-Fi Facilities/ Internet Speed	1 (20%)

Table 4 reveals that the majority (60%) of the studied libraries face the problems of support from their institutes and skilled human resources, followed by 40% of libraries facing the problem of mobile-based library services policy. Interestingly, 20% of libraries need help with cooperation from the computer centre and poor Wi-Fi/Internet speed at their campus.

Discussion

The use of mobile technologies in library services is urgently needed. The development of mobile technology has made it possible (improved) to interact with the user community. Liu and Briggs (2015) reported that libraries' mobile applications help enable Wi-Fi service, Email alerts, Ask-a-Librarian, database searching and mobile library websites on the users' mobile devices.

The study's findings (Table 2) showed that only 20% of studied libraries provide referral services, abstracting services, bibliography and literature, file sharing and current awareness service through mobile applications to the users. This finding was similar to the result of the study with minor degrees by Nalluri and Gaddam (2016) that mobile-based library services such as Library apps, referral services, e-document delivery and current contents services are highly used in libraries to satisfy users' information needs instantly. Hence, sound policy for mobile-based library services should be framed and approved in every library to help the LIS professionals for the smooth delivery of library services.

IIT libraries must remain current with their patrons' ever-shifting information requirements. Given how specialised and individualised mobile library services are, they can be provided using ubiquitous wireless technologies to enhance existing library services. A recent study by Bell (2022) reported that "academic libraries enhanced services from desktop-based library services to mobile-based library services to enhance library users' usage of library collections and services through their mobile devices". This result also matches the finding of this study. Table 3 also shows that 40% of studied libraries were enhanced listed services such as mobile library e-resources, Mobile library website/Responsive webpage, Mobile based document renewal/reservation services, Mobile Notifications/SMS, Mobile printing and Online library fee receipt using Mobile app.

The mobile Information services in university libraries were favourable to enhancing the usage of library services (Madhusudhan & Dar, 2017). Singh (2019) revealed that "setting up and implementing mobile-based applications in libraries was a boon to enhancing and digital transformation of library services in the mobile world". The study's findings (Table 3) also attest to the above studies that mobile-based applications are relevant and influential in enhancing library services for 24x7 delivery to library users anywhere, anytime.

Libraries can better serve their existing patrons and develop their relationships with them by utilising mobile technology. Both novice and experienced librarians will benefit from mobile technology to remain relevant in a world that is becoming more mobile. They must keep up with technological advancements, look ahead and prepare

for the evolution of mobile involvement in libraries. Mobile services and technologies in libraries are subject to specific restrictions.

This study found that 60% of studied libraries had faced the problems of Institute authorities' support and skilled manpower to implement mobile-based applications in their libraries (Table 4). Similar problems also reported by previous studies by Chaputula and Mutula (2018), Chisenga (2015) and Washburn (2011) have said that a lack of support from university management, lack of skilled manpower, lack of policy documents and finances are problems for the integration of mobile-based library services. Bajpai and Madhusudhan (2022) reported a need for more skills and competencies among the staff to enhance academic library services using mobile applications.

Conclusion

Mobile technology has become a boon to libraries and provides learning opportunities anytime and anywhere. According to the study's findings, all surveyed IIT libraries have yet to fully realise the potential of mobile technology for providing library services on the go. As a result, given the prospect of quick information access, mobile computing opens up a plethora of opportunities for libraries to enable access anytime and anywhere. Furthermore, identified lack of skilled manpower and support from Institute authorities are significant problems in implementing mobile library services in enhancing the usage of library collections and improving the return on investment (ROI). The study suggested that studied libraries must design and develop mobile apps to deliver library services and improve the mobile library apps, MOPAC and mobile library instructions as major lacunas.

It is hoped that library officials will be able to find and access mobile library services on the go, facilitating a unique manner of information dissemination and encouraging the practice of BYOD and accessing library resources.

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