

M-Libraries: Smart Access and Management of Information

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Abstract

This paper is the study of the management of information and access to the information resources with the application of mobile technology in Maulana Azad Library of Aligarh Muslim University system through Smart Phones, Tablets, and Personal Computer etc. The required information was collected through 175 questionnaires. About majority of students (158) use Smartphone and a very limited number of students (17) did not possess a Smartphone. It was also found that 132 students use their smart phones to access library website online and information services like E-articles and E-books. A majority of students do not have any problem in connecting mobiles or Smartphone to the library website.

Keywords: Mobile Technology, Online Access, Smart Libraries

Introduction

Information and communication technology (ICT) has changed the 'traditional library' to 'modern library' to give people a new way to access the valuable information. Mobile technology is being adopted by the people with incredible rate and it has quickly become a predominant mode of access for information needs (Murray, 2010). This technology may revolutionise the library access and use of the available resources in library. In 21st century, a growing number of people are using Internet facilities

through mobile/ smartphones, tablets, personal computers etc. Students are the majority of the users of smartphones in our country. So this chance can be used by the libraries to start mobile technology in libraries to enhance the scope of library facilities in one fingertip in the developing country like India. The main aim is to identify trends in the way people currently interact with information using their mobile phones, and then extrapolate ways that libraries could support those mobile information needs (Mills, 2009). Use of mobile technology also enhances the quality of library service in academic libraries as research and development is concerned.

Application of Mobile Phone

The information and communication technology is an inseparable part of the new world and has impressive impact on the human lives throughout the world. Wireless technology and mobile phones are inextricable mix of technology. Mobile phone serves more than a communication tool. Smart mobile phone also serves like digital camera, audio recorder, video recorder, multimedia messaging, email client, web client, gaming platform, document viewer, computer adjunct, music player, TV, bar code reader etc. In the very near future mobile will be a powerful tool and will become a dominant device for CCC (communication, computing and content). It makes a considerable impact on health service, banking, tourism, education, and day-to-day life activities. Now it is the time of m-learning which means library services through smartphones or mobile devices and it can enable the 'library on hand' trend more stronger.

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University Libraries and Mobile Users

The 2009 Horizon Report called mobile technologies an opportunity for higher education to reach its constituents in new and compelling ways. As academic or university libraries are the hub of research and development activities, mobile libraries may play an important role in fulfilling the aims and objective of the institution. There are 46 central universities, 343 state universities, 125 deemed universities, and 232 state universities in India (<http://www.ugc.ac.in/>). Total 746 universities are there in India and all the universities provide library and information services to its users. According to a survey conducted by software services firm TCS (Tata Consultancy Service), about 70 percent students today own smartphones with a larger user base in smaller cities than the metropolitan cities. Its also shows that the increasing comfort level with digital technology, social networking, smartphones and gaming helps us create conditions to unleash their creativity and innovativeness. Now a days we can see the students constantly use email, Facebook, Twitter, and other social networking sites through constant web connection feature. Many universities in developed countries started giving services through mobiles, for instance Ryerson University, a Canadian university with 25,000 student base, started to offer a mobile library service in 2008.

Services through M-Libraries

Database Searching

Academic libraries provide different types of database browsing services through library websites. Library users only have to enter the search terms to get the result. Advanced search options are also there for database browsing. This service can be accessed through small screen mobile device. Services like OPAC (Online Public Access Catalogue), original document search, OCLC's WorldCat mobile application etc. allow users to search for the desired books through a web application on smartphone or mobile phone.

SMS Notification Services

Short messaging service has great importance in day-to-day life of human being. It is used for delivering instant short messages among people. It can be used for providing

latest news, events, and notices via smartphone or tablet. SMS notification may also be automatically generated with integrated library management software. The library users can get notified instantly with alerts such as alerts for new books, informing availability of reserved documents, let know about overdue books, fines, renewal of subscription, reminders to return library material, library circulars, loan request, e-journals subscribed, change in timings, information about important events etc. Such services are provided by Murray State University Libraries (<http://lib.murraystate.edu/>).

Text Reference Services

Libraries using AltaRama's Reference by SMS service receive a unique mobile phone number that can be advertised as the text number for that library. Rather than going to a mobile phone, texts can be automatically sent to an email address specified by the library (Murray, 2010). Normally library receives lots of queries that require brief responses and reference. The librarian can provide instant answer and add link to it. Ask a Librarian is another text reference services in this advanced technological era.

QR Code in Smartphone

A QR code is a matrix type of bar code which is readable by smartphone and mobile phone with camera. In United States of America, academic institutions and libraries have implemented this technology. Any alphanumeric text often used to store URLs, text, etc., is known as 'mobile tagging'. Library exhibits include a QR code link to video, websites, survey etc. It can also be linked with library stacks, magazines/ journals etc.

Mobile Audio and Video Tours

Earlier, users had to take an appointment with librarian to take the patron serve as a guide. Obviously, that was a time taking process, but now libraries provide mobile audio and video tours for the patrons or non-patrons of the library. A user may be living at a remote location or distant geographical location. They cannot be present on site workshop, but they get access to the library tours on their mobile phone. Mobile audio and library video tours are produced quickly and are less expensive. It also saves time of staff from explaining the facilities provided by the

library. These audio and video tools can be downloaded through mobile devices. It is very helpful for the non-user of a particular library.

E-books and Mobile Reading

A huge number of academic libraries are offering Kindles and other e-book readers for circulation, often with popular fiction titles loaded on the mobile devices (Lippincott, 2010). According to Murray (2010), University of Nebraska-Omaha is experimenting with instant ILL delivery through e-book reader devices and public libraries have popular fiction e-books available for checkout through their OPACs; these are often set to expire from the reading device after a certain amount of time. Numbers of publishers are delivering e-books accessed via mobile device. These publishers provide access to various databases and e-resources such as e-books, dissertations, e-journals, audio books, streaming music, films, images and article databases which can be get accessed via mobile device. Audio books may be downloaded from library website for differently able peoples. E-books may also be available through commercial e-book readers such as nook, Kindle, and Sony Reader.

My Mobile

It is a set of personal library and information services that can be customised reflecting personal interest and research needs. This service may be traced in the Wageningen UR Library (<https://www.wageningenur.nl/en/show/What-is-My-Library.htm>). In this system, user can add databases, favourite articles or books, journal articles alerts, save the search query, post a comment, off campus access, and document ordering etc.

Mobile Devices used in a library

- Smartphones
- Cell Phones
- Tablets
- PDA (Personal Digital Assistant)
- Ipod and MP3 players.

Library Websites Which are Designed for Viewing on Smartphone/ Mobile Devices

American University Library: <https://guidebook.com/g/aulibrary/>

Boston University Medical Center Mobile Library: <https://medlib.bu.edu/mobile/>

Cambridge University Library: <http://www.lib.cam.ac.uk/camlibraries/myaccount.html>

Cornell University Library: <https://www.library.cornell.edu/>

Duke University: <http://library.duke.edu/>

London School of Economics (LSE) Library: <http://www.lse.ac.uk/library/home.aspx>

M-Learning in India

UNESCO held the Second UNESCO Mobile Learning Week (MLW) from 18 to 22 February 2013 at its headquarters in Paris, France. Evolution in education and training at a distance can be characterised as a move from d-learning to e-learning to m-learning. According to recent studies, Indian mobile phone users on an average spend 3 hours and 18 minutes every day with smartphones. With the proliferation of mobile technology in every area of life, it is very essential and need of the hour to upgrade the current library service delivery system with the help of mobile technology. India has the second largest mobile phone users base, i.e., 900 million mobile phone users. With decreasing cost of smartphones, this figure is also increasing. Government of India is promoting e-learning and one of the examples is National Program on Technology Enhanced Learning (NPTEL) by the ministry of Human Resources Development. Both e-learning and m-learning are closely related to each other and the main difference is the device use to view the content. After successful 3G net subscription, it is time to transform to 4G. 'India is expected to have 9 crore 4G subscribers

and 18 crore 4G smartphones by 2018., said in a by Bank of America Merrill Lynch. Major mobile manufacturer such as Nokia, Sony, Samsung, and Motorola have linked up with Bharti Airtel, Reliance, Vodafone, and other service providers for mobile content. Mobile apps have a great impact on the users of smartphone in India. Many institutions' websites give their service through mobile apps; it may be on different platform such as Android, ios, Windows etc. Many more m-learning applications are available in these stores. Most of the companies extended their services on smartphones. Much of the computer facilities like Windows Power Point Presentation, Word, Excel etc. are available on smartphones.

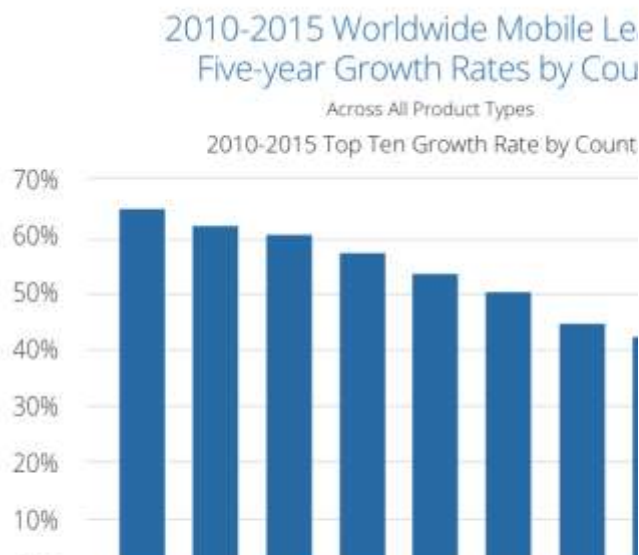


Fig. 1: 2010-2015 Worldwide Mobile Learning Five-Year Growth Rates by Country

Hewlett Packard has awarded 'technology for teaching' grants to the Jadavpur University in Kolkata to develop teaching in the university. HP also grant for HP Tablet PCs, optical drivers, wireless networking cards, printers as well as funding for project fellow to work on the project. This initiative helps the university to develop m-learning centres through which M. Tech. course content can be accessed on hand-held devices. Jadavpur University already has a digital library and content management development system using m-learning authoring tools. Anna University, Chennai was also selected for global award in India. An IT training institute in India, Aptech Learning Service, has also developed m-learning platform to serve the educational needs of institutions.

Challenges in Using Mobile Technology in Libraries

There are also some hindrances in use of the mobile technology in libraries especially in the developing countries like India. Some of these challenges are listed below:

- Connectivity and battery life
- Screen size of the mobile device
- Low bandwidth
- Files supported by specific mobile device
- Limited memory
- Copyright issues
- Risk of sudden data loss
- Demographic boundary
- Unawareness about functions of mobile etc.

Review of Related Literature

Use of mobile libraries in developed countries is very impressive but it is not so in developing countries like India. Various studies have been conducted to study about the mobile technology in libraries in India and abroad.

Kumar (2014) conducts a study on success of mobile technology in Jawaharlal Nehru University and found that 95 percent of students have a smartphone. It clearly reveals that the majority of students accept that mobile technology has become very important – even more important than food, at least in the short term.

Nowlan (2013) in his study, "Going mobile: creating a mobile presence for your library" find that 95.4 percent of students that responded to the survey had a smartphone and 75 percent of them used their mobile phones to access the web.

Trivedi and Suthar (2011) discuss opportunities to increase the boundaries of anytime and anywhere learning for students and present the proposed m-library system design of the Smt. Hansa Mehta Library (HML), the University Library of M S University of Baroda, Gujarat.

Chamberlain, Elcock, and Puligari (2015) conduct a survey of NHS health libraries in the United Kingdom to summarise how mobile technologies are being used,

how they are promoted, and how they are delivered, highlighting good practice and solutions to issues.

Malathy and Kantha (2014) indicate that library service should be flexible and open so that users approach and information needs can be met with the new technology like mobile technology. They also suggest to adopt new mobile technology services by the library as early as possible.

Aharony (2014) made a comment that because of the exponential increase in the use of mobile applications, it is intriguing to examine the interaction between students' attitudes towards m-learning and personal variables.

Holt and Walker (2011) present an overview of how Butler Community College and Wichita State University libraries provide an access point for mobile technology research. The libraries also know how to make a basic mobile site.

Objectives of the Study

The objectives of the present study are:

- To find out the use of smartphone for library services.
- To discover the training or assistance required or not to browse library webpages through mobile device.
- To identify the services that could be delivered through smartphone.
- To determine the hindrances faced by the m-libraries in providing information services through mobile phone.
- To identify the types of services which, can serve through smartphones.

Methodology

To accomplish all the objectives, a well-designed questionnaire survey of students was conducted, from March 2016 to May 2016. Students were contacted individually and given a questionnaire, together with a rationale for the study and a request for cooperation. 200 students were randomly selected out of which 175 responded. This survey was conducted in Aligarh Muslim University (AMU), Aligarh, India.

AMU occupies a unique position amongst universities and institutions of higher learning in the country. It was established in 1920, and evolved out of the Mohammedan

Anglo-Oriental College (MAO College) which was set up in 1877 by the great visionary and social reformer, Sir Syed Ahmad Khan. (<http://www.amu.ac.in/fact.jsp>). Spread over 467.6 hectares in the city of Aligarh, Uttar Pradesh, Aligarh Muslim University offers more than 300 courses in the traditional and modern branches of education. (<http://www.amu.ac.in/fact.jsp>). It has more than 28,000, students, 1,342 teachers, and some 5,610 non-teaching staff on its rolls. The university now has 12 faculties comprising 98 teaching departments, 3 academies and 15 centres and institution (<http://www.amu.ac.in/fact.jsp>).

Data Analysis and Interpretation

Table 1: Response Rate of Respondents (Gender Wise and Total)

S. No	Distributed/ Received	Total no. Of Questionnaires	Male	Female
1.	Distributed	200 (100)	100 (100)	100 (100)
2.	Received	175 (87.05)	90 (90)	85 (85)

Note: Figures shown in parentheses indicate percentages.

Table 1 indicates that 200 questionnaires were distributed and 175 were received. Response rate of total students was 90% and 85% responses from male and female respectively.

Table 2: Have and Have not Smart/ Tablet/ Mobile Phones

S. No.	Have/ Have Not	Male	Female	Total
1.	Yes	82 (91.11)	76 (89.41)	158 (90.28)
2.	No	08 (8.89)	09 (10.59)	17 (9.72)

Note: Figures shown in parentheses indicate percentages.

It is evident from Table 2 that majority of students have mobile/ tablet/ smartphones. About 158 (90.28) students have smartphones and 17 (9.72) do not possess any smartphones. Nearly 91.11 percent of male and 89.41 percent of female respondents use smart or mobile phones in day-to-day life. Very few, i.e. 8.89 percent of male and 10.59 percent of female students do not use smartphones. It shows that 90.28 percent of students are using smartphones.

Table 3: Level of Use of Tablet/ Smart/ Mobile Phone

S. No.	Level of use of smartphones	Male	Female	Total
1.	Very Important to be connected	53 (64.63)	60 (78.94)	113 (71.51)
2.	Handicapped without it.	31 (37.80)	35 (46.05)	66 (41.77)
3.	Cannot imagine life without mobile	20 (20.00)	25 (32.89)	45 (28.48)
4.	Keep smartphone always close	52 (63.41)	59 (77.63)	111 (70.25)
5.	Don't Know	02 (2.43)	03 (3.94)	05 (3.16)
6.	Any other	03 (3.65)	03 (3.94)	06 (3.79)

Note: Figures shown in parentheses indicate percentages.

It is very interesting to see in Table 3 that 41.77 percent of respondents are feeling handicapped without a smartphone. A high 71.51 percent of students think that smartphones are very important for connection with others. Around 77.63 percent of female respondents feel always keep smartphone close to themselves. And 70.25 percent of respondents use to keep their smartphones close to themselves. This study also reveals that about 28.48 percent of students accept that they cannot imagine life without a smartphone. Only 3.16 percent of respondents express that they don't know the level of use.

Table 4: Access to Websites or Webpages through Smartphone

S. No.	Access to Website/ Webpage	Male	Female	Total
1.	Yes	72 (87.80)	60 (78.94)	132 (83.54)
2.	No	10 (12.20)	16 (21.06)	26 (16.46)

Note: Figures shown in parentheses indicate percentages.

Table 4 indicates the opinion expressed by the students who access library websites or webpages through smartphone. Around 83.54 percent of respondents access library websites or webpages through smartphones. Near about 78.94 percent of female students use smartphones to access library website. On the contrary, 87.80 percent of male respondents do the same. It also clearly reveals that only 16.46 percent of respondents do not use smartphone for access to the library website or webpages.

Table 5: Need for Training or Assistance to search the information

S. No.	Need for Training	Male	Female	Total
1.	Yes	80 (97.56)	73 (96.05)	153 (96.83)
2.	No	02 (2.43)	03 (3.95)	05 (3.17)

Note: Figures shown in parentheses indicate percentages.

Table 5 depicts that majority of students welcome the need for training or assistance to search for the information through smartphone. Around 96.83 percent of respondents are agreeing to have training or assistance and only 3.17 percent of students does not need any kind of training.

Table 6: Have Problems of Library Connects you through Smartphone

S. No.	Problems to Connect	Male	Female	Total
1.	Yes	14 (17.07)	19 (25.00)	33 (20.88)
2.	No	68 (82.92)	57 (75.00)	125 (79.12)

Note: Figures shown in parentheses indicate percentages.

It is evident from Table 6 that majority of respondents agreed that they do not have any problems in connecting library websites through their smartphones. 79.12 percent of total students are very satisfied with the library connection. On the other hand, 20.88 percent of respondents are facing problems in connecting to library's website.

Table 7: Reasons for Not Wanting to Connect

S. No.	Reasons for Not wanting to connect	Male	Female	Total
1.	Don't want to get disturbed	3 (21.42)	7 (36.84)	10 (30.30)
2.	Don't like to connects except known	7 (50.00)	5 (26.31)	12 (36.36)
3.	Don't want to use smartphone for different purposes	2 (14.28)	6 (31.57)	8 (24.24)
4.	Any other	2 (14.28)	1 (5.26)	3 (9.10)

Note: Figures shown in parentheses indicate percentages.

Table 7 reveals the reasons of students for not wanting to connect with library. About 36.36 and 30.30 percent of students think they do not like to connect except to

known sites and do not want to get disturbed, respectively. About 24.24 percent of students do not want to use their smartphones to connect to library websites.

Table 8: Using Library Catalogue Through Smart/ Mobile Phone

S. No.	Use of Library Catalogue	Male	Female	Total
1.	Yes	65 (79.26)	60 (78.94)	125 (79.11)
2.	No	17 (20.74)	16 (21.04)	33 (20.89)

Note: Figures shown in parentheses indicate percentages.

Table 8 indicates that 79.11 percent of students are using library catalogue through smartphones, whereas 20.89

percent of students do not use library catalogue through smartphones.

Table 9: Preferences of Information Service / Services Through Mobile or Smartphone

S. No	Preferences of Services	Male	Female	Total
1.	E-articles, e-books	70 (85.36)	62 (81.57)	132 (83.54)
2.	Using Library Catalogue	52 (63.42)	31 (40.78)	83 (52.53)
3.	Book reservations	23 (28.04)	32 (68.42)	55 (34.81)
4.	Download e-journal articles and e-books	76 (92.68)	52 (68.42)	128 (81.01)
5.	Pay fines	12 (14.63)	06 (07.89)	18 (11.39)
6.	Library news, programmes and events	10 (12.19)	03 (03.94)	13 (8.22)
7.	Reminders	09 (10.97)	03 (03.94)	12 (7.59)
8.	Feedback	15 (18.29)	06 (07.89)	21 (13.29)
9.	Any other	03 (03.65)	02 (02.63)	5 (3.16)

Note: Figures shown in parentheses indicate percentages.

Table 9 shows the preferences of information or services accessed by the respondents using smartphones. It is very interesting that about 81.01 percent of students want to download e-journal articles and e-books services. About 83.54 percent of respondents are in the process of

browsing for e-books and e-articles. It is also very evident that 63.42 percent of male students are browsing library catalogue in comparison to 40.78 percent for female students. 34.81 percent of respondents are in favour of book reservation services.

Table 10: Location of use of Library Services

S. No	Location of Use	Male	Female	Total
1.	On Campus	62 (75.60)	62 (81.57)	124 (78.48)
2.	Within Library	29 (35.36)	52 (68.42)	81 (51.26)
3.	At Residence	39 (47.56)	31 (40.78)	70 (44.30)
4.	While Travelling	29 (35.36)	39 (51.31)	68 (43.03)
5.	Any other	04 (4.87)	24 (31.57)	28 (17.72)

Note: Figures shown in parentheses indicate percentages.

Table 10 reveals that the users use smartphones at various places or locations. About 78.48 percent of students are in favour of using mobile in campus, 51.26 percent and

44.03 percent of students use it within library and while they are at residence, respectively. About 43.03 percent of respondents use it while they travel.

Table 11: Have Multimedia Messaging Services (MMS) through smartphone

S. No.	MMS Services	Male	Female	Total
1.	Yes	68 (82.92)	70 (92.10)	138 (87.34)
2.	No	14 (17.08)	06 (07.90)	20 (12.66)

Note: Figures shown in parentheses indicate percentages.

Table 11 clearly reveals that majority of students, i.e. 87.34 percent wanted to have MMS services from library

using smartphones and only 12.66 percent of students differ not to have MMS services.

Table 12: Receive Text Reference Service through smartphone

S. No	Text Reference Service	Male	Female	Total
1.	Yes	68 (82.92)	51 (67.10)	119 (75.31)
2.	No	14 (17.08)	25 (32.90)	39 (24.69)

Note: Figures shown in parentheses indicate percentages.

Table 12 depicts that 75.31 percent of total students are in favour of receiving text reference services, whereas 24.69 percent of students do not agree to have this service.

Libraries today are covering most of the technologies given by mobile industry like PDA's, Blackberry, iPod, cell-phones, and mobilising library contents in a portable form suitable for small screen and delivering short services in the form of contents/ information with device's multiple searching features. Now a days most of the popular mobile devices have user forums where libraries can keep current with new mobile developments. The use of smartphones have outnumbered the personal computers in India and now the applications and attitude need to be developed among the users towards the changing access pattern and information delivery mechanism. This study is only confined to Aligarh Muslim University campus, Aligarh, so the results of research are limited to this environment. The considerable growth in the use of mobile phone among the students can be a boon for the libraries in providing their services on a small screen on hand-held devices. Access to the information is very important but it

Conclusion

Mobile technology has made communication and information access very convenient and timely to users from the comfort of their own homes and offices, from wherever they are with their cellular phone units or PDAs. M-libraries have the capacity to make any library a true 21st-century information hub. The Internet and networking of libraries and information centres have facilitated information access 24x7 at one's fingertips. Libraries in various countries are successfully providing library and information services through mobile phones.

is the duty of the university administration and libraries to provide quality service to the students through mobile for quality research and development activities.

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