Mobile Technology and Services its Facilities and Challenges in Modern Era: An Evaluative Study
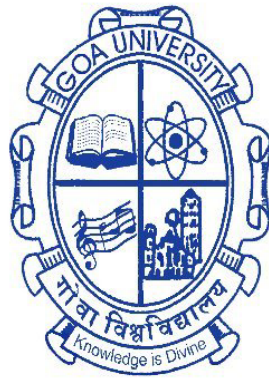
Dissertation submitted in partial fulfillment of the requirements of the

Goa University for the degree of

Master of Library and Information Science

By

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Under the supervision of

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Certificate

This is to certify that dissertation entitled **Mobile Technology and Services its facilities and challenges in modern era: An evaluative Study** submitted by Afleema Cavel D'costa in partial fulfillment of the requirement of the degree of Master of Library & Information Science of Goa University is his own work carried out under my guidance and worthy of examination.

Dr. Carlos M Fernandes

Research Guide

Department of Library and Information Science,

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Declaration

I state that the present dissertation 'Mobile Technology and Services its facilities and challenges in modern era: An evaluative Study' is my original contribution and the same has not been submitted on any occasion for any other degree or diploma of this university or other University/Institute. To the best of my knowledge, the present study is the first comprehensive work of its kind from the area mentioned. The literature related to the problem investigated has been cited.

Place: Taleigao

Date: 1st May 2022

(Afleema Cavel D'costa)

Department of Library and

Information Science

Acknowledgement

This dissertation bears the touch of many people and I am enormously grateful to each one of them. I am grateful to the Head of Library and Information Science Department of Goa University Dr. Ganesha Somayaji. In a very special way, I would like to thank my research guide Dr. Carlos M. Fernandes for his valuable guidance and for motivating me throughout this study. I would also like to thank other teachers of the Library and Information Science department, in particular Dr. Shamin Pereira, Mr. Milind Mhamal, Mrs. Novelty (Saanvi) Volvaikar e Morjekar and Mr. Rohan Parab for the help and guidance with this dissertation. I am extremely grateful to the Librarians of academic and public libraries from North and South Goa for taking part in this dissertation and so also to the Library Users for collectively participated in this Dissertation to carry out the research. I am immensely grateful to my friends. Last but not the least I am thankful to my family throughout the study.

(Afleema Cavel D'costa)

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Chapter 1

Introduction

1. Chapter I: Introduction

1.1. Introduction

The discovery of mobile telephones is a colorful accomplishment of technological development. In this contemporary generation the net technology has commenced to form and re-decorate the manner human beings create, speak and proportion the records in day today life. Now the access to information has become an essential tool. With the assist of Wi-Fi era and mobile phones the conversation and information access has become very convenient and timely to the patrons; sitting at any corner of their homes they are able to satisfy their information need. People use mobile phones as their maximum essential medium to surf the web, chat with own circle of relatives, family and friends, concentrate to track music etc. So mobile phones have grown to be an essential medium for humans to use, share and access information. Moreover, mobile technology facilitates the patrons in information seeking behavior in such a manner of teaching, learning and research work as per their needs. (Saxena, 2015).

Libraries are social institutions, connecting humans with each other and those with books and information. It is the time for libraries to take advantage of mobile technology. The conventional library services are now shifting to mobile library information **services**. The library specialists are facing tremendous challenges to provide the necessary and relevant information to their patrons at the right time. Mobile technologies have made communication and access to information timely their patrons giving less-burden to the librarians. The implementation of mobile technology modifies the traditional relationship between libraries and their patrons and introduces new section to reader's privacy. Mobile technology will help both novice and the library professional to stay relevant and focused in this mobile society. Today there is a shift from'd-learning' (distance learning) to 'e-learning' and now from 'e-learning' to 'm-learning' (mobile learning) which has reformed the education in India. (Roy, 2017)

Currently, libraries are operating in a person centered, technology primarily based atmosphere, imparting individualized value-added services. The internet and networking of libraries and information centers have eased information access for 24 hours. The library specialists are no more the caretakers of books. They do the challenging, non-commercial business of enjoyable data that desires the users. Therefore, in today's scenario the LIS specialists stay up and look forward to assume new earnings of communication for outreaching the user's information at their ease. (Roy M. &., 2017)

In library, the Mobile Technology has now come up with "Libraries in Hand" trend. The library professionals are in a change to determine these devices are affecting information access and certify that they are communicating with their patrons and providing web content in the most suitable and effective way. (Nalluri, 2016)

1.2. Objective of the study:

- To envisage the concept of mobile technologies to be functional for readers in

libraries.

- To understand the different technological aspect of mobile technologies in libraries.
- To know the pros and cons of mobile technology in libraries.
- To acquaint with the services and facilities provided by library technology oriented libraries.

1.3. Scope of the study:

The study will highlight the latest technical advancement in mobile technology and will pursue depth study in relates issues.

1.4. Hypothesis:

- Mobile technology in libraries is in infancy stage.
- The technological development in functioning of mobile libraries needs to be taken up by library professionals.
- Technological advancement in mobile libraries needs optimum utilization from library professional.

1.5. Limitation of the study:

This study is limited to 20 major libraries functioning in North and South Goa.

1.6. Research Methodology:

- The researcher has browsed all the literature available on the topic.
- Further the researcher has also visited all the websites related to the topic.
- The researcher has also visited the different stakeholders and experts asserting the opinion.
- The researcher has conducted interview with all librarians regarding use of mobile technology.
- The investigator has discussed with experts to analyse the functioning of the topic.
- The investigator has tried to collect different information by using different tools such as questionnaire, interview and personal discussion.
- This investigator has made the use of suitable statistical techniques in finalizing the data with required charts and graphs in presentation to make the interpretation clear and precise.

1.7. Population of the study:

This study has included 20 major libraries functioning in North and South Goa.

1.8. Organization of the study:

Chapter I: Introduction

Chapter II: Review of Literature

Chapter III: Mobile Technology and its Concepts

Chapter IV: Use of Mobile Technology at National and International level

Chapter V: Data Analysis and Interpretation

Chapter VI: Observation, Findings, Suggestions and Conclusion.

1.9. Conclusion:

Mobile technology has become a very important part of our lives nowadays. Mobile devices and mobile technologies have potential to facilitate the teaching and learning process in a great way. (Nalluri, 2016). In this modern age of information the future of internet depends upon the use of mobile technology in libraries because of the rapid increase of mobile users. It is a great opportunity for the libraries to rethink and remodel their existing services by adopting mobile technology facilities. The librarians have to tackle with lots of challenges with this mobile technology to be functional in libraries.

1.10. References:

1.   Saxena, A. (2013). *Impact of mobile technology on libraries: A descriptive study*. International Journal of Digital Library Services, 3(4), 1.
2.   Roy, M. & Kumar, N. (2017). *Application of Mobile Technology in Library Services.* International Journal of Information Movement, 2(7).

3.   Nalluri, S. & Gaddam, B. (2016). *Mobile Library Services and Technologies: A Study*, International Journal of Research in Library Science, 2(2), 59.

Chapter II

Literature Review

2.   Chapter II: Literature Review

2.1. Literature Review

1. Kumar, Verma & Kumar, Verma. (2018)[1] Highlights that the uses of internet through mobile devices are increasing rapidly. As a result, libraries have to make an effort to convey the services through mobile phones also. It will assist the libraries in the way of building valuable relationship and offering better services to the remote users. They also talked about the use and application of mobile technology in the libraries, their benefits, creation of mobile website, mobile applications and library services through the mobile technology.

2. Kumbhar, & Pawar. (2014)[2] Emphasized that the mobile technologies have introduced a "libraries in hand" trend. They both proposed that since libraries are currently creating digital contents accessible on computers such as digital collections could be made available and accessible on mobile phones.

3. Roy,& Kumar(2017)[3] Says that the libraries have always implemented new technologies to help in their objective of providing users with effective and efficient services, as well as timely access to needed information. Application of Information and Communication Technologies has transformed the way people access and communicate information. Users want easy and instant access to relevant information, putting burden on librarians to think out of the box to deliver information needs to their users. Application of mobile phones to provide library and information services are an interesting step in this direction. The development of mobile technology has led to shifting in the academic environment from traditional to mobile learning settings.

4. Singh & Nikandia. (2017)[4] the study explores the potential of mobile devices in library and Information centers. Application of mobile technology has change the way of people to access and communicate the information. In this 21st century library and information science professionals need to use mobile technology in libraries and this first-hand technology offering outreach technical options for the librarians. Libraries have the well opportunity to extend new altered types of library services to the users. This study is a new platform for better serving the users.

5. Anyim, Wisdom O. (2020)[5] this study highlights the application of mobile technology for access and retrieval in emergency situation. The study was done to open the libraries and users on available opportunities presented by mobile technologies for access and retrieval of information using mobile technology devices. As the covid-19 pandemic was un-seen emergency left the librarians and other information centers to close the libraries for months and entire users were hinged from accessing physical libraries. However, this paper discovered that library services can still be accessed through mobile devices and applications such as online reference services, online databases, mobile personal

space or my library through smartphones and social media network. The study identified various mobile applications which will be in depth in this article.

6. Panda, Subhajit. (2020)[6] discover the challenges faced by libraries to satisfy their readers and streamlines to rethink and remodel the library services by adopting technological challenges. This paper outlines the concept and applications of developments in mobile telecommunication system, web technologies to provide ubiquitous, user friendly personalized and dynamic up to date information to the users of library.

7. Saxena & Yadav. (2013)[7] The study explores that there is a growing impact of mobile technology in libraries, especially as network access becomes more affordable and trustworthy and mobile applications have seen conventional acceptance in teaching, learning and research work. This tendency will likely to carry on and one way libraries can respond to this appearing tendency is to make the library's website easily accessible through web-enabled mobile phones.

8. Kumar, S. & D, K. (2013)[8] highlights the reviews on the different services offered by the libraries in which the mobile phones can be used effectively. They proposed that mobile phones can be used effectively in the education setup. Library services are the bedrock of education and training and increased emphasis on continual, self-directed learning poses a considerable challenge to libraries. This short review shows that several organizations such as libraries, documentation centers involved in the effective communication through mobile phones.

9. K, H. (2004)[9]This study deals with the application of wireless technologies in libraries, its benefits and issues to consider for installing such a network, wireless internet access and short messaging service in libraries. The paper describes various wireless technologies like Bluetooth, infrared and wireless LAN. The benefit of wireless LAN like mobility, simplicity, installation speed, flexibility, reduced cost and scalability have been explained and highlights the various wireless LAN technologies like Narrow-land Technology, Speed Spectrum Technology etc. It also discusses the working of a wireless LAN, Its range and coverage, compatibility with existing networks, security, safety and cost of wireless LAN. It further highlights various mobile technologies like wireless application protocol, general packet radio service and universal mobile telecommunication system.

10. Negi, D. (2014)[10]Described how mobile technologies are being used to create new types of libraries and information centers. Creating a library app or mobile website that allows patrons to access library hours, view their library account or even search databases is easier than most people assume. The resources should assist libraries in planning and implementing their own distinct mobile presence.

11. Maideen, S. (2017)[11]explains how mobile technology has increased access to

information while also forcing the libraries to rethink and remodel their services in order to keep up with the technological advancements. Today mobile phones are becoming an indispensible aspect of everyday life, transforming the way people connect and interact with the world. Mobile technology will be a huge aid to libraries towards strengthening their relationship and providing enhanced user-oriented services to the existing users. Libraries can well reach out to the remote users who were considered unlikely to connect because of absence of a medium. Further the study discuses on the need, advantages, drawbacks, barriers and solutions for proper implementation of the mobile technology in libraries.

12. Sharma, & Sahoo (2014)[12] stressed the importance of putting information and communication into practice. People's access to and communication of information has changed as a result of technological advancements. Users want quick and easy access to relevant information, forcing librarians and information scientists to think outside the box to suit their needs. A big step in this approach is the use of mobile phones to provide library and information services. Because of the advancement of mobile technology, the academic atmosphere has shifted from traditional to mobile learning environments. This article discusses the use of mobile technologies in libraries and information services. It also envisions the future of mobile library technology, according to them.

13. Bhoj, S. (2020)[13] this study examines libraries as social structures that connect people to information. Now is the moment for libraries to embrace mobile technologies. Both novice and experienced librarians will benefit from mobile technologies in order to remain relevant in today's mobile world. For those who desire to use library services, mobile devices and services provide a lot of flexibility. This article also includes a list of library services available via mobile technology, as well as results from a study of mobile-based library services in India's libraries.

14. Kumar, R. (2017)[14] explains that the world no longer operates the same way because of the fast improvement in technology in the last two decades, primarily due to the emergence of the internet. Following the internet, the introduction of wireless networks and more recently, mobile devices such as smartphones and tablets, contributed significantly to the development of mobile technology. Libraries will benefit greatly from mobile technology in terms of enhancing their relationships with existing users and providing greater user-oriented services. The paper goes on to discuss the benefits, challenges and solutions for a successful use of mobile technology in libraries. It also outlines the types of infrastructure that libraries will need to successfully provide these services.

15. Wadhwa, V. (2019)[15] highlights that with the introduction of ICT, libraries have improved their services. This innovative technology arena provides real-time assistance to users regardless of geographical borders. The mobile landscape has expanded significantly, and libraries are now considering deploying mobile

technologies. Within that time, mobile technology has connected libraries to their global readers. This research goes on to cover some of the most popular approaches that advanced libraries are using to deliver services via mobile devices. Rising mobile apps are paving the way for libraries to become more user -friendly and accessible to a wider range of materials. It also covers mobile applications and library service challenges.

16. Ram, B. & Singh, K. (2020)[16] explores how ICT may be used effectively in resource centers. The library evolved from a traditional to modern stage, at which time automated libraries, digital libraries, and cell phones were used. Mobile phones have become an essential part of human life for communication, and also help students with their e-learning. This study foes into greater detail into mobile innovation, focusing on its applicability and challenges in library management. Libraries can use mobile phones to build new administrations and provide faster access to their collections. Academic libraries have faced both opportunities and challenges.

17. Soni (2019)[17] investigates the "Libraries in Hand" for speedy dissemination of information to consumers which employ a variety of technologies such as library automation, barcode, scanner, RFID, QR Code, and so on. In libraries, mobile technology is a relatively new concept. The impact of mobile technology on library services, needs, benefits, drawbacks, impact, solutions and applications as well as libraries, is the subject of this study. Users can use all of the library's resources and keep themselves up to date by using their mobile devices.

18. Nagarkar, S. (2013)[18] focused on an overview of how to apply and exploit advances in mobile telecommunication systems, online technologies, and geographic systems such as GPS/GPRS to give library users with worldwide, user-friendly, personalized and vigorous up-to-date information services. Libraries will benefit greatly from this new technology in terms of improving their relationships with existing users and providing a better user experience. Libraries may be able to reach out to new/remote users who were previously thought unlikely to connect due to a lack of technology. They should be implemented in accordance with the organization's information security rules and standards.

19. Nalluri, S. & Gaddam, B. (2016)[19] pointed out that the mobile landscape has expanded substantially, and those libraries are now researching and experimenting with this technology as well. This study looks at some of the most innovative library techniques for delivering services via mobile devices. It also provides an overview of current trends in mobile tools and their applications for libraries, such as internet mobile, mobile multimedia, SMS/text messaging, and so on, as well as descriptions of the various activities these devices support for library use, with a focus on how libraries and librarians are responding with services tailored for these devices and what libraries can do in the future.

20. Karadia, A. & Seth, A. (2015)[20] looked into how mobile technology is advancing

to provide portable, instantaneous access to the universe of knowledge across subject, discipline, and industry borders. Libraries nowadays are not lagging behind in adopting mobile technology in order to meet the growing demand for electronic resources as well as the continual collection and archiving of digital information. The use of mobile technology allowed library users to integrate the physical and virtual collections available at the library, improving the user experience. This study attempted to highlight the use of mobile technology in detecting and recognizing e-resources through the practical application of QR codes, with a focus on the successful case at NIT Rourkela's Central Library.

21. Dei, (2020)[21] emphasized that, in recent years, consumers of academic libraries around the world have adopted mobile technologies as a medium that can provide valuable library services to the library users. The goal of this study is to determine whether academic libraries in Ghana have the ability to adapt and deploy mobile-based library services. The research was descriptive survey that used a mixed-method technique. The main findings were that there is a high level of knowledge and appreciation for the use of mobile technology library services among library management and students, but that mobile technology-based library services have not been fully adopted in libraries due to a variety of factors.

22. Shrivastav, S. (2015)[22] explained the deployment of information and communication technology, has transformed the way people obtain and exchange information. Users want quick and simple access to relevant information, putting pressure on librarians to come up with new ways to suit their information needs. Mobile phone applications that provide library and information services are a big step in the right direction. Because of the advancement of mobile technology, the academic atmosphere has shifted from traditional to mobile learning environments. The assumption of mobile technology in library services, its purpose, literature analysis, various devices, advantages and limitations and conditions for adopting mobile-based services, among other things, were also highlighted in this study.

23. T, M. (2016)[23] described that smart-phones have made it feasible to connect with any associated organization from anywhere in order to gain access to essential library resources. The study focuses on using mobile apps to provide library services. The paper goes on to discuss why the library has to develop mobile apps in order to provide better service. The study's most essential component is the 'contents of the mobile library app', which outlines the app's contents. Some of the existing library mobile apps are given, along with brief descriptions of the apps. It also emphasizes the promotion and evaluation of the library's mobile app.

24. M, S. & Dange, J. (2017)[24] discovered that digital technology has increased access to information while also forcing libraries to rethink and remodel their services in order to keep up with technological advancements. Mobile phones have become an integral part of daily life, transforming the way people connect

and interact with the world. Mobile technology will be a big aid to libraries in providing improved user-oriented services to existing users in this changing environment. This study looked into how mobile technology can be used to provide library services. The advantages of using mobile technology in libraries, including mobile websites, OPACs, and mobile applications, as well as the advantages of the mobile web. It has been determined that mobile technology has a greater impact on libraries, especially as network access becomes more affordable and reliable. Libraries can adapt to this emerging trend by making their collections more accessible via mobile devices.

25. Kumar, S. (2013)[25] stressed that mobile phones are growing increasingly popular in today's society, and that they are nearly vital in people's daily lives. People adapt to mobile technologies faster than they do to any other technology. People are more willing to use their mobile devices to access information. Mobile phones and other mobile devices provide libraries a new and interesting way to distribute information to people wherever they are. Libraries are expected to incorporate these technological advances to supply their services to the user. Population in this changing environment. Libraries should be updated to meet the evolving demands of their patrons. In today's fast-paced environment, mobile library services can address people's information needs. This study examines and appreciation for the use of mobile technology library services among library management and students, but that mobile technology-based library services have not been fully adopted in libraries due to a variety of factors.

26. Murphy, J. (2014)[26] emphasizes that mobile devices are the 'IT' technology, and that everyone wants to know how to use them in their settings. The best examples and insights on using mobile technology in libraries are included in this book. From designing marketing applications to augmented reality, the chapters cover a wide range of the most crucial tools and techniques. This book will provide readers with a comprehensive and up-to-date understanding of the library apps for portable devices. The portable librarian conferences have been a focal point for learning how to integrate mobile technology into library services and collections. It compiles the best parts of that long story and provides librarians with the case for and implements mobile-device-enabled library programs.

27. Ocran, T. (2017)[27] looked at contemporary library trends, particularly in academic libraries, which require remote and boundary-less access to library services. The purpose of this study is to see if the University of Cape Coast Library management personnel and fifteen students (ten undergraduates and five postgraduates) participated in the pilot study. Students should be taught about the benefits of using mobile devices to access library services, and library staff should be sufficiently prepared for such services, according to the study's recommendations. Management should also allocate extra resources to ensure that the resources are implemented successfully.

28. Acheampong & Dei, (2020)[28] argue that despite the growing sue mobile devices and the availability of mobile technology and Wi-Fi internet almost everywhere in academic libraries in developing countries. The academic libraries in Ghana have not yet to fully exploit this opportunity and provide mobile technology-based library services. As a result, the purpose of this study is to determine the level of library management awareness regarding the deployment of mobile technology library services in Ghanaian academic libraries. The majority of respondents were aware that mobile devices could be used to access library services, and were willing to be trained, adapt and update their skills to benefit any mobile service technological change undertaken in academic libraries, according to the study, which used a descriptive survey and a mixed method to collect data.

29. Buruga, B. (2016)[29] wanted to know how Muni University libraries can use mobile technologies to deliver social media-based services effectively. In response to student and staff feedback that mobile and social media technologies are critical for providing 21st century library services and resources. They recommend that these technologies be used to access subject guides, MOPAC, a mobile website, a library map, and resources and reference services at the local university library. However, unreliable internet connectivity, a lack of a library staff member responsible for managing technologies, a lack of adequate skills among users, and library staff required to use social media technologies were all identified as barriers to the use of mobile and social media technologies in this study.

30. In his book, A. Gleason (2015)[30] answers questions about the mobile technology platforms, security, best practices and more. You'll find previews of a variety of library-related apps. Resources and web-links for additional research. Mobile technologies are grouped by chapters on various themes connected to mobile technology in each library. To help you get started with adopting mobile technology in your library, each chapter is grouped by sub-topics and includes ideas and examples from the real library programs.

31. This book by A. Peters & L. Bell (2013)[31] provides the librarians with the information and guidance they need to adapt themselves and their facilities to the mobile revolution. The book also includes an up-to-date examination of how mobile technologies are impacting library use, library services, library systems, librarians, and the library users in a variety of settings. The authors address aspects of the mobile revolution that are less frequently covered in the literature, such as mobile health information services, the impact of the mobile revolution on physical libraries, and how new mobile technologies are creating professional development opportunities within the profession.

32. Soni, N. & Sudan, U. (2015)[32] investigate how LIS professionals in library services use and are aware of mobile applications and technologies. With special reference to Madhya Pradesh, India's northwestern region. The user's knowledge of ICT, instant messaging and communication, use of social networking sites for

library services, any application for online reading, and reference services, applications for use by organizations, productivity, and their work and comfort ability in using mobile applications, app for navigation or mapping are all covered by the questionnaire.

33. Kari, H. (2019)[33] looked at how library users and professionals felt about the usage of mobile devices in libraries in his research. To meet the study's goals, the researcher investigated five hypotheses. The study was conducted using a survey research design. The study's findings were analyzed using descriptive and inferential statistics. According to the findings, both library users and professionals are aware of mobile technologies, are eager to incorporate them into library services, and are affected by perceived ease of use and utility. The results have been examined in terms of their practical and theoretical consequences.

34. Kapondera, S. & Ngalande, E. (2020)[34] examined that the use of mobile technologies in Malawian academic libraries with a focus on Mzuzu University Library. The study's goal was to see how prevalent mobile technologies are in the library. The most common mobile technologies in the library are mobile phones and tablets. The research also showed that nearly none of the company's services have gone mobile. Higher prices for mobile technologies, poor institutional ICT policy and a lack of expertise in using mobile technologies are the key reasons leading to low application and use of mobile devices in libraries.

35. Shonhe, L. & Jain, P. (2017)[35] highlights how technological advancements have resulted in a greater use of mobile devices due to their capacity to connect to high speed wireless data networks. Mobile technology offers a variety of benefits to information seekers, including 24/7 connectivity and self-service, infinite access, and time savings. Because the use of handheld devices has exploded, information providers have little choice but to create a mobile web platform for information distribution. The goal of the study was to determine which library services are provided through the use of mobile technology, and the requirements for a successful implementation of mobile-based library services. It also discussed aspects of user readiness to access information through mobile technology.

36. Liu, Y. & Briggs, S. (2015)[46] this study investigates the current state of mobile services among academic libraries of the country's top 100 universities, as well as best practices for librarians implementing mobile services at the university level. The authors investigated each of the top 100 university libraries experiences with mobile services through in-depth websites visits and survey questionnaires. The findings revealed that each of these libraries provided a variety of services. The greatest amount of database and catalogue access. In addition, survey responses revealed a trend toward responsive website design, which allows visitors to browse the library's whole website from any mobile

device.

37. Madhusudhan, M. & Dar, S. (2017)[37] examines the mobile library services developed and accepted by a number of well-known academic libraries in order to facilitate the mobilization of their existing services and to determine how beneficial such services can be to the user community. Furthermore, the study raises awareness of the necessity of mobile library services, which are already in use in a number of academic libraries to mobilize information in a quick and time -bound way without regard for space or time restrictions. The study's purpose is to assist academic libraries in identifying and adopting mobile projects. Libraries can offer a wide range of mobile services to interested users.

38. Sahoo, S. (2019)[38] this study shows that mobile technology is common to all of us who use modern communication technology. In today's world, libraries are increasingly employing mobile devices, which are more popular in terms of digital technology used in communication. The usage of mobile technology is forcing academic libraries to modify the way they provide services, allowing them to connect and interact with both library users and non-users. This research also looks at the need for mobile technology in academic libraries, as well as the benefits, drawbacks, hurdles, and solutions.

39. Wani, S. (2019)[39] highlights that mobile applications, allow users to access a variety of databases and information from all over the world. Users are a physical presence for information access during the library opening hours in traditional library. However, in the age of digital technology, library services are becoming more technical and timely. As a result, users can access any information from any location. This research also looks at mobile apps and their usage in library and information science services, as well as their features, benefits, and drawbacks as well as their dependability, security, and cost as well as the need for a mobile library and future plans.

40. Acheampong, E. & Dei, J. (2020)[40] assess some of the challenges associated with delivering library services on mobile technology platforms. This study was conducted using a survey research design and a mixed method methodology. Mobile digital deposit, mobile OPAC, referencing services, SMS alerts, SDI and mobile instructional guides and tours are among the most popular mobile technology based library services highlighted in the survey. Inadequate ICT infrastructure, a lack of IT professionals and employees, a lack of policy framework, unpredictable or unstable power supply, and financial constraints all prevented the full provision of library services via mobile technology across the library's studies. Based on these findings, the study makes some recommendations to help academic institutions overcome some of the problems involved with implementing mobile technology based services.

41. Rawlins, B. (2014)[41] explains that as more users expect to use their mobile devices, librarians will want and need to develop the necessary skills to reach

this growing user base, libraries and librarians will benefit from mobile devices: A practical guide for librarians when planning, creating, implementing, promoting and assessing mobile services. This book also contains why mobile technologies are vital for libraries, how to utilize mobile devices for reference, library training and shelf reading and marketing techniques to make users aware of mobile services, all based on research and experience using and building mobile devices.

42. Lyabode, A., Adetoro, N. & Eniola, S. (2014)[42] investigates the perspectives of library users at two academic institutions on the provision of information services via mobile technology. The data demonstrated a significant prevalence of internet-capable mobile devices, which were utilized to conduct various types of information searches. It also revealed that those university libraries do not already offer mobile technology-based information services. Library users, on the other hand, prefer mobile devices for information services delivered via mobile technology. The study also identified certain obstacles that impede the delivery of information services using mobile technologies.

43. Gibson, J. & Nmecha, A. (2020)[43] looked at how libraries can help spread information about corona-virus disease in Nigeria. It goes through the many types of libraries and the services they provide. The study found that consumers had a wide range of information needs, which might be provided by mobile libraries and internet based library services. Lack of facilities, illiteracy, poverty, lack of infrastructure and other factors made it difficult to obtain information. Through educational, recreational, collaboration with other institutions, social media, mobile phone, and other services and roles, the library can prevent and control the spread of corona virus among library users.

44. Siregar, A. & Dewiyana, H. (2018)[44] highlights the information society, particularly library users, expects a simpler and faster way to obtain information and share knowledge .The library also employs the most effective and efficient means of providing the best service and disseminating and sharing information with its users . Mobile technology is one technology that helps libraries to be more connected to its users. The results of using mobile technology applications in libraries provide significant benefits in terms of offering improved library services and enabling easy access to library materials.

45. Gholami, Z., Abdekhoda, M., & Gavgani, V. (2018)[45] argue that mobile technology has become an intrinsic part of our life in recent years. The goal of this research is to find out what factors influence mobile technology. Adoption in the context of a library. To that goal, a conceptual model based on an integrated technology was presented. Models of organization and the environment. The study's findings indicate that the proposed model is a good fit for identifying influential elements in mobile technology. Adoption in the context of a library. Furthermore, regression analysis revealed that perceived ease of use, perceived usefulness, compatibility and relative advantage are determinant factors in academic

librarian's adoption of mobile technology based on library services.

46. Kenchakkanavar, H. & Kenchakkanavar, A. (2015)[46] explored the potential of mobile devices in libraries and information centers. In today's world, we live in a virtual environment. Professionals in library and information science in the twenty-first century mostly employ mobile technology in libraries, and this new technology provides librarians many outreach technical choices. Libraries have a great chance to provide users with new and diverse sorts of library services. This study offers a fresh way to reach out to students and employees. The primary goal of this research is to examine how mobile technology is used in higher education, with a focus on how well it is used in libraries and library services.

47. Damilola, A. & Okesanya, R. (2017)[47] focuses on the use of mobile technology for the provision of reference services in Nigerian university libraries. The study was prompted by the discovery that most university communities rely heavily on mobile technology in academic libraries to locate, retrieve, evaluate and use information as well as the need for libraries to assist these information users with the use of mobile technology to meet their professional information needs.

48. George, B., Maina, J. & Wanangeye, L. (20)[48] looked into the use of mobile phone technology in library resource and service access and utilization as a manner of re-engineering library holdings to promote their library resources and services. The study discovered, among other things, that using mobile phone technology enhanced retrieval and use of library resources and services at Mount Kenya University's Kisli Campus.

49. Mishra, A., Jha, J. & Umre, S. (2017)[49] present a brief overview of mobile application technology and its application in library services in this study. The paper also examines the different types of mobile apps, as well as mobile apps for librarians and the information professional community. It also highlights specific apps that are available to librarians and briefly describes the salient features of apps, as well as the benefits and potential drawbacks of using them. It also highlights important considerations, such as security, reliability, availability and cost, that library information professionals should be aware of before using mobile apps. This study also goes into the various reasons for our mobilization as well as the plan.

50. Potnis, D., Harms, R. & Cortez, E. (2016)[50] highlights mobile applications and mobile websites (MAMW) represent information systems that are increasingly being developed by libraries to better serve their patrons because of a lack of in-house IT skills and the knowledge necessary to develop MAMW, a majority of libraries are forced to rely on external IT professionals who may or may not help libraries scare financial resources. This study applies a system analysis and de perspective to analyze the experience and advice shared by librarians and IT professionals engaged in developing MAMW. This study also identifies key steps and precautions to take while developing MAMW for libraries. It also advices

library and information science graduate programs to equip their students with the specific skills and knowledge needed to develop and implement MAMW.

References

1. Verma, K.M. & Verma, K.N. (2014). *Application of mobile Technology in the Libraries*. (Conference paper). Libraries towards Digital Paradigm, Faizabad, India.

2. Kumbhar, S. & Pawar, R. (2014). *Mobile Based Services: Application & Challenges*. (Conference paper). Changing Trends in Academic Libraries and Librarianship in Digital Environment, Shivaji University, Kolhapur.

3. Roy, M. & Kumar, N. (2017). *Application of Mobile Technology in Library Services*. International Journal of Information Movement, 2(7).

4. Singh, K. & Nikandia, P. (2017). Role *of Mobile Technology and Their Application in Library Services in Digital Era*. International Research: Journal of Library and Information Science, 7(1).

5. Anyim, Wisdom O. (2020). *Application of Mobile Technologies for Access and Retrieval of Information in Emergency Situation: An Eye Opener for Libraries and Information Users*. Journal of Computer Science and Technology Studies, 1(2).

6. Panda, S. (2020). *Mobile Librarianship: An Initiative of New Normal*. International Research Journal of Multidisciplinary Studies, 9(6).

7. Saxena, A. & Yadav, R. D. (2013). *Impact of Mobile Technology on Libraries: A Descriptive Study*. International Journal of Digital Library Services, 3(4).

8. Kumar, S. & D, K. (2013). *Application of Mobile Technology in Library Services: A Review*. 9th International Caliber 2013.

9. K, H. (2004). *Application of Wireless Technologies in Libraries*. 2nd International Caliber 2004.

10. Negi, D. (2014). *Using Mobile Technologies in Libraries and Information Centers*. Library Hi Tech News, 31(5).

11. Maideen, S. (2017). *Mobile Technology for Academic Libraries: An Overview*. (Conference paper) Emerging Trends in Library and Information Science, Skyline University, UAE.

12. Sharma, D. & Sahoo, R. (2014). *Application of Mobile Technology in Library Services: An Overview*. International Journal of Information Technology and Library Science, 3(1).

13. Bhoj, S. (2020). *Mobile Based Library Services*. Indian Journal of Library Science and Information Technology, 5(2).

14. Kumar, R. (2017). *Implementation of Mobile Based Library Services and Technologies in Libraries*. World Wide Journal of Multidisciplinary Research and Development, 3(6).

15. Wadhwa, V. (2019). *Library in Hands: Incorporating Mobile Technology into Library*. Journal of Advances and Scholarly Researches in Allied Education, 16(2).

16. Ram, B. & Singh, K. (2020). *Innovative Library Services in Mobile Technology: A Recent Approach*. International Journal of Information Dissemination and Technology, 10(4).

17. Soni, (2019). *Libraries in Hand: An Impact of Mobile Technology on Library Services*. (Conference paper) Library and Information Services: Emerging Digital Paradigm, Ghaziabad, U.P.

18. Nagarkar, S. (2013). *Use of Mobile Technology in Library Services*. Indian Streams Research Journal, 3(11).

19. Nalluri, S. & Gaddam, B. (2016). *Mobile Library Services and Technologies: A Study*. International Journal of Research in Library Science, 2(2).

20. Karadia, A. & Seth, A. (2015). *Mobile Technology in Libraries for Discovering E-resources and Services*. (Conference paper) Design and implementation of library automation using Koha, Jawahar Navodaya Vidyalaya, Boudh.

21. Dei, J. (2020). *Assessing Adoption and Implementation of Mobile Technology-Based Library services in Academic Libraries*. International Journal of Innovative Technology and Exploring Engineering, 9(3).

22. Shrivastav, S. (2015). *Use of Mobile Technology in Library and Information Services*. American Research Thoughts, 1(7).

23. T, M. (2016). *Library Mobile Apps: For Effective Services of Library*. Journal of Library and Information Communication Technology, 5(2).

24. M, S. & Dange, J. (2017). *Library Services through Mobile Technology*. International Multidisciplinary E-journal, 6(5).

25. Kumar, S. (2013). *Mobile Phones: A New Dimension in Library Services*. International Journal of Library Science, 7(1).

26. Murphy, J. (2014). *Mobile Devices and Library: Handheld Tech*, Handheld Reference. Routledge.

27. Ocran, T. (2017). Implantation of Mobile Technology Based Library Services: A Case Study of University of Cape Coast, University of Pretoria.

28. Acheampong, & Dei. (2020). *Management Preparedness towards the Implantation of Mobile Technology Library Services in Academic Libraries*. Library Philosophy and Practice, 1-11.

29. Buruga, B. (2016). *The Use of Mobile Technologies for Social Media* based Service Delivery at Muni University library. University of Pretoria.

30. Gleason, A. (2015). *Mobile Technologies for Every Library.* Rowman & Littlefield.

31. Peters, T. & Bell, L. (2013). *The Handheld Library: Mobile Technology and the Librarian*. ABC-CL10.

32. Soni, N. & Sudan, U. (2015). *Usage & Awareness of Mobile Applications and Technology by LIS Professional in Library Services: Special Reference to North-West part of Madhya Pradesh*. 10th International CALIBER-2015, 298-305.

33. Kari, H. (2019). *Libraries and Mobile Technologies: An Assessment of the*

Deployment of the Mobile Technologies in Libraries. Global journal of library and information science, 2 (16), 1-9.

34. Kapondera, S. & Ngalande, E. (2020). *Adoption of Mobile Technology in Malawian Academic Libraries: the case of Mzuzu University.* (Conference paper), 165-174.

35. Shonhe, L. & Jain, P. (2017). *Information Dissemination in the 21st Century: The Use of Mobile Technologies.* Information and knowledge for competitive, university of Botswana, Gaborone.

36. Liu, Y. & Briggs, S. (2015). *A library in the palm of your hand: mobile services in top 100 university libraries.* Information technology and libraries, 371-381.

37. Madhusudhan, M. & Dar, S. (2017). *Mobile information services and initiatives in university libraries: A new way of delivery of information.* Journal of library and info. Technology, 37(2), 109-118.

38. Sahoo, S. (2019). *Transformation of academic library service in the purview of the mobile technology.* Journal for all subjects, 8940, 1-7.

39. Wani, S. (2019). *Mobile library and services: A new trend in libaray & information science.* Asia Pacific journal of library management and info. Technology, 5(1), 1-4.

40. Acheampong, E & Dei, J (2020*). Investigation into the challenges associated with the delivery of library services on mobile tech. platform.* IAFOR journal of literature & librarianship, 9(1), 78-92.

41. Rawlins, B. (2014). *Mobile devices: A practical guide for librarians.* Rowman & Littlefield.

42. Lyabode, A., Adetoro, N. & Eniloa, S. (2014). *Mobile technology and information services provision: Preception of library users in selected universities.* Global Educational journal of library & information science, 2(2) 37-50.

43. Gibson, J. & Nmecha, A. (2020). *Role of libraries in dissemination information on corona virus disease in Nigeria.* Academic journal of current research, 7(11) 11-19.

44. Siregar, A. & Dewiyana, H. (2018). *Mobile technology for expansion of service range Medan public library.* Journal of physics: conference series, 978(1), 1-5.

45. Gholami, Z, Abdekhoda, M. & Gavgani, V. (2018). *Determinant factors in adopting mobile technology based services by academic librarians.* DESIDOC journal of library & information technology, 38(4), 271-277.

46. Kenchakkanavar, H. & Kenchakkanavar, A. (2015). *Mobile technology based*

information services in the digital world. International journal of development research, 5(9), 5474-5477.

47. Damilola, A. & Okesanya, R. (2019). *Use of mobile technology for provision of reference services in Nigeria university libraries.* Library philosophy and practice 29(2).

48. George, B., Maina, J. & Wanangeye, L. (2016). *Analyzing the use of mobile phone technology in access and utilization of library resources in Mount Kenya University, Kisii campus.* World journal of computer application and technology, 4(1), 15-21.

49. Mishra, A., Jha, J. & Umre, S. (2017). *Mobile app and the library services.* International journal of information libraries & society, 6(1), 27-32.

50. Potnis, D., Harms, R. & Cortez, E. (2016). *Identifying key steps for developing mobile applications and mobile website for libraries,* Information technology and libraries 35(3), 43-62.

Chapter III

Mobile Technology and Its Concept

3. Chapter III: Mobile Technology and Its Concepts

3.1. Introduction

Mobile technology is typically described as the technology used in cellular communications. It may be greater extensively described as any technology that is transportable and makes use of Wi-Fi connectivity. This wide definition could encompass gadgets consisting of include of cell phones, tablets, computer system and even laptops.

3.2. Definitions

The Cambridge Dictionary defines mobile technology as 'electronic equipment such as mobile phones or small computers that you can use in different places, and the technology connected with them'. (Cambridge dictionary)

Personal Digital Assistants (PDAs) and Smart phones are mobile devices that are agents of real-time communication. (Chang, 2012).

The Mobile Technologies includes i-Pods, MP3 player, Personal Digital Assistants (PDAs), USB Drive, E-Book Reader, Smart Phone, Ultra-Mobile PC and Laptop/Tablet PC etc. (Hussain, 2009).

According to Hamad, Farajat, & Hamarsha (2018), mobile technologies are handheld information objects that include hardware (devices), software (interface and

applications) and communication (network services). It can also be defined as technology that uses radio frequency spectrum in any band to enable the transmission of the text data, voice, video or multimedia services to mobile devices with freedom of time and location limitation (Kim, Mins & Holmes, 2006). Thus, they include mobile phones, portable digital assistants and integrated wireless solutions (Jarvenppa & Land, 2005; Roy, Das, & Majumdar, 2016).

3.3. Concept of Mobile Technology

Mobile technology is a type of technology in which a patron makes use of a mobile phone to perform communications related job, such as communicating with friends, relatives and others. It is used to send data from one system to another. Portable two-way communications systems, computing devices, and go along with networking equipment make up mobile technology.

Mobile technology is a kind of technology that is mostly used in cell correspondence and other related angles. Mobile technologies have made global wonders, and proven it a powerful and effective means that accelerates success of project objectives and finally the improvement of goals. Effectiveness and data quality gains have been believed as a rule for many applications and frontier of possibilities opening up new opportunities for language teaching and learning. Mobile-assisted language learning is employed all over the world as it advances. As against different varieties of computers, smartphones require most effective one hand to perform and consequently have an immediacy of use that different minicomputers, such as tablets, have yet to attain. The possibilities of using mobile technology are endless. It makes use of a shape of level wherein numerous transmitters can ship data in the meantime on a solitary channel. This stage is referred to as code division numerous entrances (CDMA). This stage enables numerous clients to make utilization of single frequencies since it limits the probability of obstruction of frequencies from at least two sources. This channel has advanced during the years. The portable innovation is speedy advancing all through the years; its users are getting to be different and are step by step supplanting some comparative sources in the market. (Ram, 2020).

Mobile technology is largely employed in cellular communication systems and other related areas. It employs a network architecture that allows various transmitters to convey data on a single channel at the same time. Because it decreases the potential of frequency interference from two or more sources, this platform lets multiple patrons to use single frequencies. The channel has developed over time. This is fast growing, its applications are getting increasingly large over time, and it is gradually replacing other similar sources of communication on the market, such as post offices and landlines. Mobile technology has advanced from a simple phone and texting device to a multi-tasking system that can be used for GPS navigation, internet browsing, gaming and instant messaging among other things. With the growth, experts assert that the future of computer technology is dependent on wireless networking and mobile computing.

Through tablets and small Pcs, mobile technology is becoming popular. This smart-phone system has since been improved to a big multi-tasking computer that can be used by GPS navigation, gaming, internet browsing, and instant messaging. Tablets and portable laptops have increased the adoption of mobile technology. The mobile networks that connect these devices are termed as wireless systems. They allow speech, data and (mobile) apps to be shared between the mobile devices. (Sharma, 2014).

Mobile technology is becoming increasingly frequent. Smartphone users have exceled 3 billion, and the global mobile workforce is expected to reach 1.87 billion by 2022. Any instrument with internet capabilities that can be accessed from anywhere is termed as mobile technology. Smartphones, tablets, some iPods, and laptops already fall in this category, but this list will undoubtedly grow in the coming years.

Mobile technology encompasses of all computing devices that allow internet connection and communication at any place and at anytime. Wireless and cellular technologies permit continued connection to work, chat with family and friends regardless of our physical location. Today this technology is present everywhere in our society.

Mobile technology is reshaping society, communications and the global economy with cell phones, smartphones and tablets now outnumbering desktop computers, there has been a sea change in the way people access, use, and share information. Powerful mobile devices and sophisticated digital applications enable users to build business, access financial and health care records, communicate with public officials and complete online transaction. More globally, such devices and applications have helped to reduce social inequality, increased participation in civic life and increased education levels all of which spur national economic development.

(Pandit, 2020) We are in digital era and this technological age is characterized by "personal and technical mobility". There is the evolution of mobile devices such as mobile phones, MP3 players, tablets, PDAs. This evolution, coupled with seemly growing wireless internet connections and the embracement of universal swift-speed mobile broadband makes mobile technology a critical innovation if institutions are to meet the needs of their patrons/customers. Mobile technology has changed the way how people communicate. Mobile technologies augment the way people access, receive and interact with information, and they provide new channels for partnership and communication (Hamat et al 2018), these new technological developments provide faster access to an increasing volume and variety of information. Sabah (2016) opined that mobile technology (specifically cell phones and tablets) has already proven effective in all aspects of daily life. Users are increasingly depending on mobile devices as the most important means of performing many daily activities such as web navigation, email access, reading books and social media engagements with friends. Mobile technologies provide easy to use technologies and immediate access to vital information. It is considered a contemporary technology with enormous benefits to individuals, educational institutions, corporate organizations, and government agencies. Mobile devices provide a transportable way to access data across borders, areas and

institutions.

People progressively want to accomplish daily activities easily and rapidly by means of mobile devices and indeed mobile technologies are changing society through how people create, share information and collaborate with one another (Wasserman, 2010; West & Ei, 2014). Although mobile technology is an emerging technology, because of its vast benefits, technology experts and stakeholders are utilizing their applications in their various workplaces.

This revolution in how consumers and businesses access information and the far-reaching consequences of such uses represents a fundamental turning point in human history. For the first time, people are able to connect with one another in a relatively inexpensive and developing countries; the growth in mobile technology has been accompanied by job creation and knowledge transfer, as well as deepened social and economic connections.

(Kumar, 2017) Mobile technology has made communication and information access very convenient and timely to patrons from the comfort of their own homes and offices and from wherever they are while on the move with their cellular phone units. The worldwide mobile telephone subscriptions are at 7.6 billion more than half of the global population. These statistics are substantial evidence that people everywhere interact with information. As today's cellular phones have more features and capabilities than ever before, including mp3 players, picture messaging, and video streaming and become more data capable. Fewer people need a computer to collect information. Mobile devices, which were initially devised with an intention to replace telephones using wireless technology, have now become a very important part of daily communication not only for telephone service users but also for the internet users. These mobile devices are now popularly used especially, for surfing the web, listening to music, watching television, reading books and interacting with friends and family. So, from last decade the mobile phones have become one of the major interfaces people use to access and share information. They are increasingly no longer physical places. As most library users owning a mobile phone and increasing numbers of these being smart phones, it is time for libraries to take advantage of the mobile technology. Mobile technology will help both the novice and the experienced library staff to stay relevant in an increasingly mobile society. They need to be aware of technological changes, peer forward and prepare for the future of library mobile interaction. Smart phones can access networks and content can be continually streamed over a network, providing content on demand and making it unnecessary to maintain a paper copy of the material.

Mobile technologies are now regarded as essential means for delivering library services to their patrons. Mobile technologies describe hardware and software features of communication technologies. These technologies are regarded as mobile because they can be carried along from one place to another. People virtually carry their mobile phones with them everywhere unlike the laptops or computers. With the introduction of mobile technology completely reformed the communication landscape. Due to the

evolution of mobile technologies the mobile libraries have came into existence. The mobile phone technology has changed from being a status symbol to become an important item that almost everybody must have.

Oblinger & Lippincott (2005) asserted that key projects in several area shave indicated how mobile technology is capable of molding and empowering people, advance change and promote the development of 21st century skills. The success of mobile technology and its numerous accompanied applications can be attributed to the astonishing growth in mobile devices, the growth in mobile broadband internet connections (Domingo & Gargante, 2016).

3.4. Characteristics of Mobile Technologies

There are some of the important characteristics of mobile technology mentioned below:-

- Accessibility: Information is always accessible when requested by the users.

- Immediacy: Users can retrieve information instantly.

- Interactivity: Through different media the users can interact with peers, teachers and experts efficiently and effectively.

- Context- awareness: The environment can adjust to the users to provide adequate information.

- Permanency: The information remains unless the users purposely remove/delete it.

- Mobility: Transfer of the learning process away from the fixed point, without restrictions of time and place limits, and the user have more freedom of movement at any time and at anywhere.

- Interaction and sharing: Achieving any idea of sharing and cooperation between the users and with their peers regardless of the geographical area.

- Mobile technology has been a focus and title of scientific and international conferences in previous year due to the pandemic which resulted in a set of properties.

- It saves time and comfort travel and the mobility of the users.

- Since a mobile is a handheld device it provides the patrons with fast storage and with efficient operations.

- Personalization: The massive quantity of information, services and applications are currently available on the internet, and the relevance of the information users receive is of great importance. Since the owners of mobile technology often require different sets of applications and services, m-commerce

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applications can modify information or services in ways appropriate to a precise user.

- Dissemination: Some wireless infrastructures support simultaneous delivery of data to all mobile users within a specific geographical region. This functionality offers an efficient means to disseminate information to a large consumer population.

3.5. Application of Mobile Technology in Emergency Situation

(Anyim, 2020) Technology plays a crucial role in the present era. Libraries and many other information centers across the globe at any time can face emergency situations wherein it can become very difficult for the librarians to provide the necessary and required information to their patrons. The most recent and relevant example of emergency situation for libraries is the lockdown caused due to Covid-19 pandemic. This situation forced the libraries and other information centers to close down their activities temporarily, for the safety of the staff, students and their users. There are many other occasions where the emergencies like natural disasters, security issues, serious contagious diseases etc. With these occurrences the libraries are forced for partial closure which affects the library users to visit the libraries. This creates a blockage between the users to visit the library. In such emergency situations when physical access is interrupted, the mobile technologies can continue to provide the necessary services to their patrons without any interruption. The dependence on technology in such situation is the only solution for the progress and to meet the user needs at the right time.

3.6. Use of Mobile Devices for Information Access and Retrieval

(Anyim, 2020) The appearance of mobile technologies is switching the way information is being conveyed and acquired. Pathways to communication and information transmission become less burdensome as the users can access the library services from their homes without having to come to the physical library. Possibly, almost all libraries and users seem to be unaware of the information services and delivery potentials of mobile devices. Various information services that can be accessed with the use of mobile applications are discussed below:

i. **Online/ Mobile Reference Services:** Libraries get loads of queries from the information seekers everyday and it becomes very difficult for the library professionals to handle these huge numbers of queries but the introduction of various communication technologies made the work of library of professionals much simpler wherein they can attend multiple queries at the same time and satisfy their users. Nevertheless, reference services can be carried out using the social media platforms. Such platforms include skype, WhatsApp, Facebook, Live Video Interaction etc. Online platforms provide libraries with great advantage including creating a bond between the users and the librarians, conference chat and can provide services without physical

barriers at any time.

ii. **Mobile-based Databases:** This technology provides information to the users to access and retrieve information with great ease. With the advent of mobile applications several online databases are made accessible to the users. It offers faster means of accessing information. With mobile public access catalogue, users can find the available information. When mobile technologies are well put forth, emergency situation may only obstruct physical access to the library but users can still access the library resources virtually.

iii. **Mobile Personal Space or My Library:** This mobile library application is a self -service system that allows information users the opportunity to create and manage personalized accounts with custom-made collections. Here the users can setup and manage their profile, renew borrowed items and document delivery requests. The information providers are able to send customized scanned documents, images, audio books and e-books to library users personalized accounts. General information with respect to general and specific information could be obtained through users personal account.

iv. **Short Message Service (SMS):** This includes the use of mobile technology to distribute information in the form of text messages and multimedia content i.e. videos, audios and images. The library users' profile and contact numbers recorded by librarians to update the users with notification regarding fees, renewals, issue return and new arrivals in the library.

v. **Social Media Networks:** This is the best technological innovations that have gained worldwide acceptance in academic libraries of the 21st Century. Both the libraries and information seekers use the social media platforms for information dissemination. Social media networks are also utilized for collaborative and group chat.

vi. **Quick Response (QR) Codes:** QR codes are two dimensional barcodes that serve as pointer to desired websites. It provides information to users a direction to websites where they can access their desired information. Information professionals use this technique to direct users to relevant or important websites, either on a certain topic or library adverts.

vii. **Online VOD (MVOD) System:** This system has been used by libraries to enable user's access videos that meet their needs. It allows users to play videos using their mobile devices through a WI-FI/ 3G or 4G network.

viii. **Library Websites:** Library website is an important device used by the library to upgrade and market the library resources, services, mission, newsletter etc. is provided by the library website.

ix. **Mailing Lists:** It is almost impossible for users and libraries not to use email

in this technological era to send information. Mailing list is the most common technique of circulating the information. Using email in library services is very crucial as it permits individuals to receive required information.

3.7. Library Mobile Apps and its Uses

i. **WorldCat Mobile:** WorldCat mobile provide users a catalogue of online library resources including books, journals, movies, music, games etc. Results from the search can hold items that are accessible at local libraries. You can access WorldCat on http://www.worldcat.org.

ii. **WorldWeb Dictionary:** WorldWeb Dictionary is an English dictionary and thesaurus app, created by Worldweb Software and it contains over 285,000 words, phrases and entries. It has an audio version which is available for a fee. Worldweb Dictionary works with iPhone, iPod touch and iPad.

iii. **Encyclopedia Britannica Mobile:** This is mobile website that provides a search box and a list of proposed searches. Results from the search include full-text entries containing images that are enlargeable.

iv. **Meebo Mobile:** This application allows users opportunity to chat with friends or peers and also enables library professional to monitor library's chat services. Meebo has user friendly interface and capacity to aggregates multiple chat accounts into one definite interface.

v. **Library of Congress (LOC):** Library of Congress mobile app provides users access to a pull of collection that includes books, journals, audio, videos, photos and other applicable resources.

vi. **Medline Plus Mobile:** Medline Plus Mobile website created by the US National Library of Medicine which provides health related information such as medical articles-diseases, conditions, wellness, drug prescription information, public health and current health news.

vii. **OECD Factbook2010:** OECD Factbook 2010 was designed by the organization for Economic Co-operation & Development to share current, social and environmental statistical data. The data contained in this app is organized into 12 categories. There contains other specific sub-topics with statistical data presented in tables. It can be downloaded free of charge. (Anyim, 2020).

3.8. Advantages of Mobile Technology

(Verma, 2014) The use of mobile technology has grown over in last decade and its use

are going up in very fast because it is at low cost than computer and easy to handle it influenced the everyday life of a common person. The mobile phone provides internet access to people who may not able to afford computers. Thus, the rapid growth in use of mobile technology is based on factors such as ease of using technology, cost and portability.

Applications of mobile phones to provide library services offers new avenues for libraries and they can improve the efficiency of library services by communication of information and fast delivery of services to several users at the same time even then they are on move. In all over the world, many college and university libraries are successfully providing library services through mobile phones. There are lots of advantages of mobile technology in libraries like:-

1. **User Friendly Aid**

   Understanding with their own devices and technology helps the patrons in retrieving information speedily and does not require orientation and training. Mobile patrons are utilizing the facilities on mobile phones like SMS, instant messaging, web browsing, e-mail to communicate effortlessly. Most of these features are pre-installed on mobile devices or option for data plan packages.

2. **Personalized Service**

   Personalized service assists the patrons to interconnect with library staff to seek particular information or reference away from library.

3. **Ability to Access Information**

   Information accessed from anywhere at anytime will be of great help for patrons who cannot come upon the library in person and provides a continuous link to required information resources.

4. **Time Saving**

   Patrons need not track information about resources while browsing and searching library resources or wait at the library transaction counter to renew or reserve books and hence the time of the patron is saved.

5. **User Participation**

   Libraries can enhance OPAC (Online Public Access Catalogue) by allowing

patrons to take in patron created content like notes or images uploaded by users. Through designing of mobile based website, library makes it more interactive by adding chat rooms, blogs, social interface etc.

6. Location Awareness

Mobile content allows libraries to convey location-based services content through the potential of a global positioning system (GPS). Libraries can direct their patrons through maps and navigational software to find a particular document or service. From any part of this world, they can access the library all they need is an active internet connection, access to library website and a smart mobile phone. A single resource of the library can be accessible from many mobile phones.

7. Access to Print-Disabled Users

Mobile communications help to provide services orally to vision-disabled and physically handicapped patrons.

8. Quick Feedback

Through mobile technology users can give quick feedback related to library service and get quick response related to their queries. (Bhoj, 2020).

3.9. Limitations/Barriers of Mobile Technology in Libraries

Although mobile technology holds great promise for library services, there are some limitations or barriers of implementation of mobile services and technologies in the libraries that are as follows:-

1) Reach of an external vendor into the digital collections and technologies sustained access will be an extremely important issue for libraries if they adopt mobile library technology and services that offer content from providers outside the library.

2) Libraries should be cautious of delivering user information to locations in the cloud that may offer a different level of protection from that provided by in house library infrastructure.

3) Setting up text alerts, for instance, requires technical expertise from staff who understand how the library management system produces notifications, as well

as staff or consultants who can help to set up an interface with a sim card modem or a suitable service in order to deliver those notifications as text alerts.

4) Another pressing concern about mobile technology in the library is privacy because of the risk that patron usage information can be used and exploited by law enforcement official and those who commit identity theft. Mobile technology is changing the relationship between libraries and their users by expanding services and posing new challenges to reader's privacy. (Nalluri, 2016).

5) Problems in searching and reading the content needed for mobile users from the library perspective.

6) Some of the digital content can only be accessed on certain devices, and this can have a "chilling effect" on learning and library service because it locks some people out.

7) Lack of appropriate mobile-friendly academic content to meet the user needs.

8) Difficulty in delivering content to an increasingly mobile student body.

9) The use of wireless devices is growing quickly, yet there is fear in the scientific community that this technology could have adverse effects.

10) The dearth of technological expertise among staff members and increasing staff reductions.

11) Mobile technology in libraries is usually expensive for small libraries with less budget and resource intensive.

12) Limited memory of the mobile devices is also a problem.

The Mobile phones are still regarded by the large number of people as a medium for making phone calls and text messages, so they often do not use them in other activities, such as information seeking. However, people are more dependent on their mobile phones and there is a handful of people who wisely use them as diaries, for taking note of something and for e-mail and internet access. As a result, there may be an increase in hope from library users that libraries will provide some services in a mobile friendly way. (Nalluri, 2016).

3.10. Conclusion

The main purpose of the library is to provide quality of services to satisfy their patrons with the correct and relevant information at the right time. Mobile phones are the most important tools to communicate information. The people living in a society use mobile phones to communicate and share their thoughts, facts, conversations and general information. The dissemination of processed information is a common factor in a

civilized society. The several organizations like libraries and other information centers are involved in this process. Libraries especially use several tools and techniques to circulate the information to the user community. For this reason, the use of technology is very crucial. Mobile technology has become boon to the libraries. A library may reach the remote users effectively by adopting the mobile technology in its services. According to Malathy and Kantha (2013) the library guidelines and services should be flexible and open so that new information needs of users in pursuit of organizational needs are met with new technologies. The task of libraries is to exploit new technology in a more effective way to promote and integrate them into the design of future library services in a cost-efficient manner.

However, one cannot neglect the policies and standards of information security of the organization. Since, the feature like always on and continuous connectivity makes new devices more vulnerable to security threats, the same need to be addressed cautiously before setting up the library services for mobile devices. It is very essential for the libraries to be dynamic and change their outlook to adopt new technologies and to develop new kind of relationships with users.

(Panda, 2020) Due to the current occurrence of corona-virus pandemic, the world in which libraries exist changed drastically. Though the use of mobile technology has grown over the years but now in this current scenario the libraries are fighting against the new challenges in proving relevant and adequate library services to their patrons. A mobile phone is very portable and affordable and very easy to use so the libraries are implementing it in the libraries this helps the library staff to stay connected with their patrons in difficult situation and can satisfy their patrons at anytime and anywhere.

3.11. References

1. Singh, K. & Ram, B. (2020). *Innovative Library Services in Mobile Technology: A Recent Approach*, International journal of information dissemination and technology, 10(4), 192-193.

2. https://dictionary.cambridge.org

3. Chang, C.C., Tseng, J.S., & Yan, C.F. (2012). *Perceived Convenience in an Extended Technology Acceptance Model: Mobile Technology and English Learning for College Students*. Australian Journal of Educational Technology, 28(5), 809-826.

4. Adeeb, M.A., & Hussain, I. (2009). *Role of Mobile Technology in Promoting Campus-Wide Learning Environment*. The Turkish Online Journal of Educational Technology, 8(3), 48-57.

5. Kumar, R. (2017*). Implementation of Mobile Based Services and Technologies in Libraries*; World Wide Journal of Multidisciplinary Research and Development,

3(6), 103.

6. American Research Institution. (2016). *Mobile Technology*. The Brookings Research Institution.

7. Dei, J. (2020). *Assessing Adoption and Implementation of Mobile Technology-Based Library Services in Academic Libraries*, International Journal of Innovative Technology and Exploring Engineering, 9(3), 1670-1671.

8. https://www.pactworld.org

9. Kim, D. , Park, J. & Morrison, A. (2008).*A Model of Traveler Acceptance of Mobile Technology*, International Journal of Tourism Research, 10, 396.

10. Anyim, Wisdom O. (2020). *Application of Mobile Technologies for Access and Retrieval of Information in Emergency Situation: An eye opener for libraries and information users*. Journal of Computer Science and Technology Studies, 1(2), 26-30.

11. Panda, S. (2020). *Mobile Librarianship: An Initiative of New Normal*. International Research Journal of Multidisciplinary Studies, 9(6), 15.

12. Nalluri, S. & Gaddam, B. (2016). *Mobile Library Services and Technologies: A Study*. International Journal of Research in Library Science, 2(2), 59-60.

13. Hashim, Y., Osman, A. & Gelany, A. (2016).*Mobile Technology and Education: Theoretical Study*, International Research Journal of Computer Science, 3(2), 24.m3.3

14. Singh, K. & Nikandia, P. (2017). *Role of Mobile Technology and their Application in Library Services in Digital Era*, International Research: Journal of Library & Information Science, 7(1), 164.

15. Kumar, B., R, V. & R, P.(2013). *Application of mobile technology in library services: A Review*, 9th International CALIBER-2013, INFLIBNET Centre.

16. Malathy, S. & Kantha, P. (2013). *Application of Mobile Technologies to Libraries*, DESIDOC Journal of Library & Information Technology, 33(5).

17. Wani, S. (2019). *Mobile Library And Services: A New Trend in Library and Information Science*, ELK Asia Pacific Journal of Library Management and Information Technology, 5(1), 4.

Chapter IV

Mobile Technology at National and International Level

4. Chapter IV: Mobile Technology at National and International Level

4.1 Introduction

Mobile technology in libraries is now at National and International level. Mobile technology in the libraries is executed and used in different libraries in different ways. This chapter gives a gist of implementation of mobile technology in libraries at International and National level and world-wide to see how different libraries provide different types of services to their patrons through mobile technology in the best possible ways.

This chapter gives a gist of implementation of mobile technology by the libraries world-

wide and to see how different libraries provide different types of services to their patrons through mobile technology in the best possible way in the libraries.

4.2 Mobile technology at International level

As we know, the technological developments have influenced the user's information needs and perception of libraries. Now users want easy and instant access to right information without much effort and application of cellular telephones to offer library offerings will show to be a boon to the users. It will facilitate the customers to use library anytime, and anywhere. (Verma, N. & Verma, M. 2014)

At international level following libraries in the world have implemented mobile technology to provide efficient services.

4.2.1. Mobile Technology at the Library of Congress, U.S.

(Hayden) The library was founded on April 24, 1800, when U.S. President John Adams approved the $5,000 appropriated by Congress when the U.S. capital moved from Philadelphia, Pennsylvania, to Washington, D.C. The library of Congress is the biggest library in the world, with millions of books, recordings, photographs, newspapers, maps and manuscripts in its collections. The library preserves and provides entry to a rich, numerous and enduring supply of knowledge to inform, encourage and engage you in your intellectual and innovative endeavors. (Billington, 2021).

National Library Service (NLS) is a free braille and talking book library service for people with temporary or permanent low vision, blindness or a physical, perceptual or reading disability that prevents them from using regular print materials. Through a national network of cooperating libraries, NLS circulates books and magazines in braille or audio formats that are instantly downloadable to their mobile devices.

Mobile Apps from Library of Congress

Mobile apps from the library of congress let you connect to collections, services and special features in new ways from your smart-phone or other mobile device.

1. The Congressional Record App

One can read the daily edition of the congressional record on your iPad, iPhone or iPod touch. The Congressional Record app is presented by the Library of Congress using data provided by the office of the clerk of the U.S.

2.   Aesop for Children

47

The Aesop for children interactive book is designed to be enjoyed by readers of any age. The book contains over 140 classic fables, accompanied by beautiful illustrations and interactive animations.

3. LOC Collections

Through mobile technology we can explore the library of congress digital collections. The LOC is the largest library in the world. Use of LOC collections to access iconic photos, historic maps, books, films, newspapers, manuscripts and sound recordings. To celebrate the 220th anniversary of its founding, the LOC had announced the release of the LOC Collection App, the premiere mobile app that puts the national library's digital collections in the hands of users everywhere. In addition to providing an easy, accessible way to search and explore the library's growing digital collections, LOC Collections allows users to curate personal galleries of items in the library's collections for their own reference and for sharing with others. Items currently featured in the app include audio recordings, books, videos, manuscripts, maps, newspapers, notated music, periodicals, photos, prints and drawings. "The Library of Congress collection can now fit in your pocket", said the librarian of Congress Carla Hayden. Users can currently find the app for iPhone and iPad at the library's website or the iTunes store. An android version of the app is stated for released later in 2020. (Congress.gov United States Legislative Information).

Access: https://www.loc.gov

4.2.2. Mobile Technology at the National Library of Singapore, Singapore

The National Library of Singapore was founded in 1823 and is closely linked to the founding of Singapore's first major educational institution. It is located at 100 Victoria Street in the National Library Building. (Singapore, 2022).

The National Library of Singapore provides services through a mobile app.

NLB Mobile App

The NLB Mobile App lets you read and learn on the go anytime, anywhere. It lets you:

- Read e-books and e-audio-books online.

- Access to current issues of e-newspapers and e-magazines.

- Access to e-learning video tutorials.

- Search for and reserve titles in library catalogue.

- Check your account and pay outstanding charges with PayPal/credit card.

- The NLB mobile app is available on IOS and android.

Edit with WPS Office

Access: https://mobileapp.nlb.gov.sg

4.2.3. Mobile Technology at the National Library of China, China

The books and documents from imperial libraries dating back to the Nan (Southern) Song dynasty are housed in Beijing's National Library (founded 1127). It also has books from the Qing period, imperial colleges, and private collectors, as well as inscribed tortoise shells and bones, ancient manuscripts and block-printed volumes. (https://www.britannica.com/plpace/National-Library-of-China).

The National Library of China provides mobile digital library service, which launches some featured columns such as National Library of China news and events, culture express recommended books and information retrieval according to its own resources and updates regularly. The service requires reader's mobile phone available for GPRS. After registration from the webpage of "Zhangshangguotu" on National Library of China's website, download mobile digital library client software, and install it on the phone to the mobile digital library. The service enables the readers to customize or cancel a specific service, or scan updated information. Users can also take the initiative to update according to the clues. The National Library of China does not charge any fees of the services, but the mobile operators sometimes charge for GPRS, which causes the cost.

Access: http://www.nlc.cn.

4.2.4 State Library of Western Australia, Australia

The State Library of Western Australia is a research, reference, and public lending library in Perth, Western Australia. It is located in the Perth Cultural Center. It is managed by the Western Australian Library Board and is a portfolio agency of the Western Australian Department of Culture and the Arts. Western Australia's documentary heritage is collected and preserved by the state library in particular.

Members of the State Library now have access to resources via an app. From the comfort of your phone or tablet, you may access to e-books, e-magazines, e-newspapers, films and even language study assistance. Some of the mobile apps are listed below:

i.   Borrow-Box

Borrow-Box is an app that allows you to explore, borrow, and read or listen to e-books and e-audio books from your library from anywhere. You can simply log in with your library card number to access the library's collection of e-books and e-audio books. This app is available only on the App Store for iPhone, iPad and Apple Watch. (Bolinda Digital Pvt Ltd).

ii. Flipster

Flipster is a digital magazine subscription comprising 29 popular best-selling titles such as Australian Personal Computer, Australian Women's Weekly, Choice, Marie Claire and Money. It is available to view on your computer or mobile device for State Library of Western Australia members.

(Government of Western Australia)

Access: https://slwa.wa.gov.au/

iii. Kanopy

Kanopy members have access to a range of films including award-winning documentaries, training videos, and theatrical releases, through the State Library and Western Australia public library.

iv. Libby by Over-Drive

Libby is a mobile app that allows users to access the Western Australian Public Libraries over-drive collection of e-books, e-audio-books and e-periodicals. Libby is a quick and appealing digital browsing experience that lets you synchronize your reading across numerous devices.

v. Online Book Club

Members of the Western Australian Public Library can participate in a state-wide Online Book Club, which gives them access to a variety of volumes throughout the year. The Online Book Club is comparable to in-person book clubs however it takes place via the internet. You can participate using your mobile device.

vi. UTalk

UTalk is language learning software that offers courses in over 140 languages in a fun and engaging fashion, featuring short 10 minute lectures and interactive games that test and improve on your vocabulary. (Government of Western Australia).

4.3 Mobile Technology at National Level

At National level, following are the examples of mobile library websites of different libraries:

4.3.1 Mobile Technology at Central Library, Indian Institute of Technology (IIT) Delhi.

The Indian Institute of Technology (IIT) in Delhi is one of the 23 IITs established in India to serve as centers of excellence for science, engineering and technology training, research and development. It was established in 1961 as a College of Engineering, the Institute was later renamed "Indian Institute of Technology" Delhi after being designated as an Institution of National Importance under the "Institutes of Technology (Amendment) Act, 1963." It was thus designated as a Deemed University, with the authority to set its own academic policies, administer its own examinations, and confer its own degrees.

On their library website, the Indian Institute of Technology's Central Library offers the following mobile-based services:

- Web OPAC: Single window search-search the library catalogue to find what you're looking for.

- Ask a Librarian: Users need to submit query/questions along with name and email address.

- New clipping services: The central library has been collecting news clippings from various e-resources/ Google alerts connected to higher education/ IITs/ Academic topic.

- Mobile App: The mobile app provides a single window search for IIT Delhi on a single platform.

- Online book suggestion system: recommends books to the library over the internet.

- E-resources: An alphabetical listing of e-journals, as well as miscellaneous/individual journals. It contains details on the book display, library hours, freshly arrived books, membership, interlibrary loan and former IITD exam papers, among other things. They also put on the 2021 virtual book exhibition.

Access: https://library.iitd.ac.in/

4.3.2. Mobile Technology at JDR Tata Memorial Library – Indian Institute of Science

Library, Bengaluru

On their library website, JDR Tata memorial library offers the following mobile based services:

- Web OPAC/ Online catalogue: Web OPAC can be used to search for papers, renew book, and make reservations.

- Remote/ off campus access to online resources publications, these and dissertations from the Indian institute of science.

- Renewal books on the internet. Patrons may renew their borrowings as many times as renew they like as long as there are no reservation.

- E-books and e-journals are example of e-resources.

- Users can utilize their mobile device to as inquires or submit queries, along with their name and email address. It also includes info. Such as working hours, a staff directory, book arrangements, library news, events and so on.

Access: https://library.iisc.ac.in/.

4.3.3. Mobile Technology at BITS Pilani Library, Rajasthan

- With particularly tailored info service to fulfill the needs of its customers, the BITS Pilani library seeks to assist the institutes teaching, learning, scholarship and research operation.

- On their library website, BITS Pilani offers the following mobile-based services: Remote access to resources: the remote access service allows academic, research scholars, and students to access resources from anywhere on the Pilani campus with ease.

- Web OPAC, online book catalogue: web OPAC allows members to search for books magazines articles, AV material, projects, among other things, by author, title, subject, keywords and other criteria. It also provides info on new arrivals, allows users to search books by subjects obtain in the list of journals and access popular documents, among other things.

- Book finder: book finder is a user interface that assists users in locating books various halls/ section.

- Search journal by subject using the periodical finder.

- Plagiarism, Mendeley, research, tools, these and reports are all examples of research assistance.

- It shows library brochures, the library floor, library data, library news, rules and regulation and library staff among other things.

- The objective of the virtual library tour which created in the form of film and shown on the internet, is to show people what the library has to offer that they may get the most out of this service.

Access: http://library.bits-pilani.ac.in/

References

1. Billington, J.H. (2021). Library of Congress. Encyclopedia Britannica.

2. https://www.loc.gov

3. https://mobileapp.nlb.gov.sg

4. https://www.britannica.com/plpace/National-Library-of-China

5. http://www.nlc.cn.

6. https://slwa.wa.gov.au/

7. https://library.iitd.ac.in/

8. https://library.iisc.ac.in/.

9. http://library.bits-pilani.ac.in/

Chapter V

Data Interpretation and Analysis

5. Chapter V: Data Interpretation and Analysis

5.1 Introduction

The procedures of attributing meaning to acquired data and determining the relevance, consequences of findings, and conclusions are known as data interpretation and analysis. Working with data sets in any field of study necessitates data interpretation and analysis.

Data analysis is a process that involves gathering, manipulating and examining data in order to gain a deeper understanding or, to put it another way, it summarizes the information gathered. In research, the purpose of data analysis is to present reliable and accurate data.

Data Interpretation is the process of going over data and applying established methods to it in order to assign meaning to it and come to a suitable conclusion. The most

important aspects of any research are the data interpretation and analysis processes.

5.2 Data Collections

Data have been collected from the Librarians and from the Library Users. Questionnaires were distributed to both the librarians as well as to the users through Google forms as well as through personal survey. It was distributed to North and south Goa academic and public libraries.

5.3 Librarian's Analysis

Responses from librarians: Questionnaires were distributed to the library professionals through survey and some via an online Google form were sent to the college library's email address. Questionnaires were distributed to academic as well as public libraries in the North and South district of Goa. This study has been done to find out the viewpoints of the library professionals in Goa on mobile technology in libraries.

1. Do you have a smart-phone?
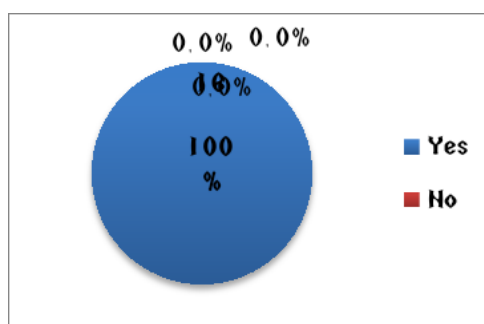
Figure 1: Librarians who have a smart phone

As can be seen in the above pie chart that all the library professionals working in libraries in North and South Goa have a smart phone. The goal of this query is to see if all librarians have smart phones and, if so, to learn about mobile technology in this context.
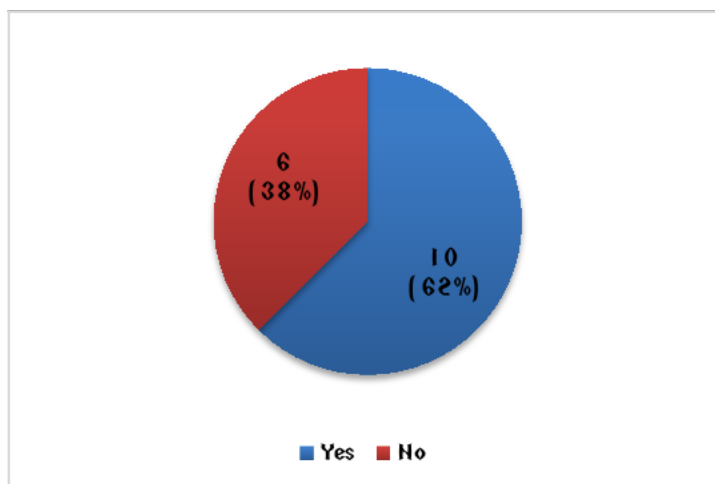
2. Do you use mobile phone in the library?
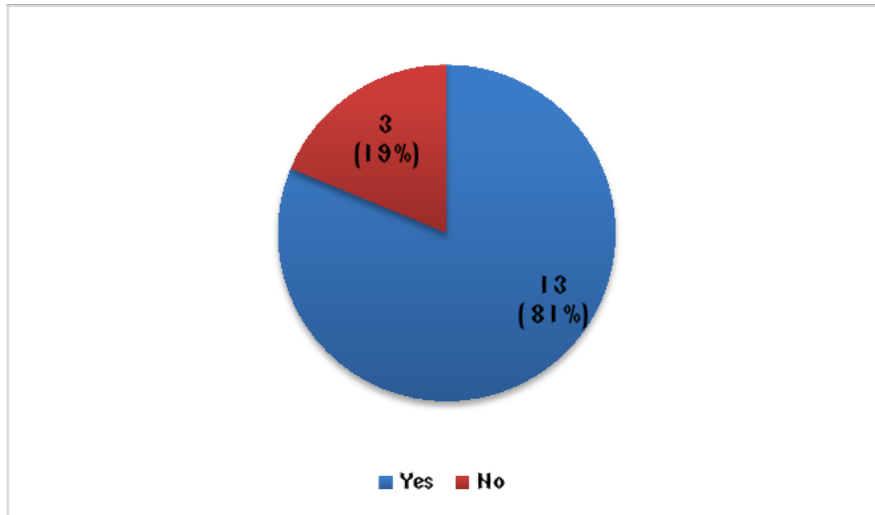
Figure 2: Librarians who use mobile phone in the library

According to the above pie chart, 13 (81%) of the librarians use their mobile phones in the library, whereas3 (19%) of librarians does not use the mobile phones in the library.

3. Do you allow patrons to use mobile phone in the library?

Figure 3: Librarians who allow patrons to use mobile phone in the library

From the above pie-chart we can say that 10 (62%) of librarians allow their patrons to use their mobile phones in the library, while 6 (38%) of the library professionals do not allow their patrons to use mobile phone in the library.
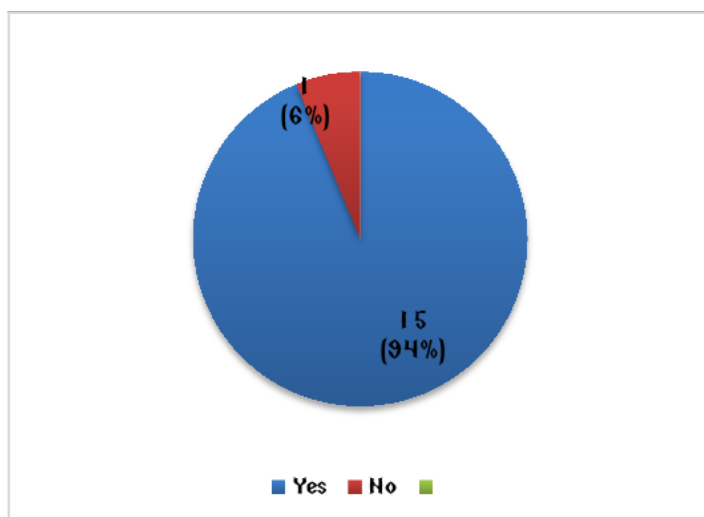
4. Does your library have proper internet/Wi-Fi facilities?
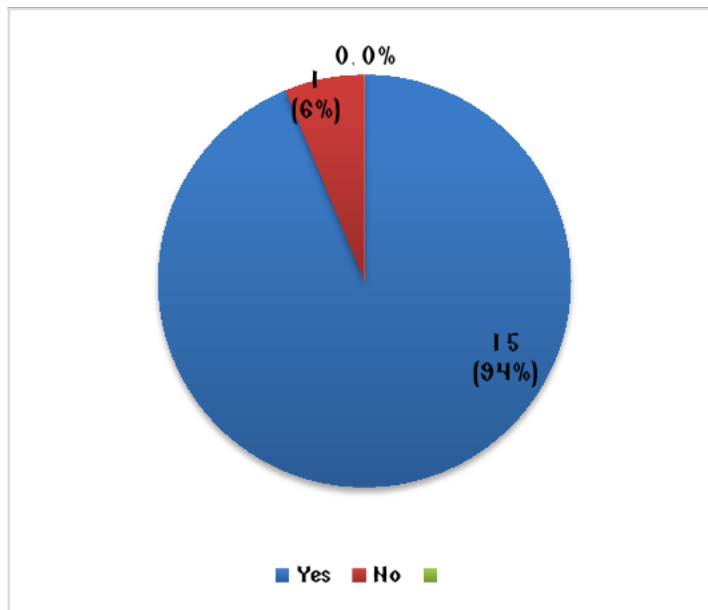
Figure 4: Libraries which have proper internet/Wi-Fi facilities

According the above pie-chart 15 (94%) library professionals say that they have proper internet/Wi-Fi facilities while 1 (6%) of the library professionals say that there is no proper internet facilities in their libraries.

5. Does your library have a library website which has responsive design for mobile device viewing?

The above pie-chart shows that 15 (94%) of the library professionals says that, they have a library website which has responsive design for mobile device viewing, whereas 1 (6%) of the library professionals says that they do not have such facility.
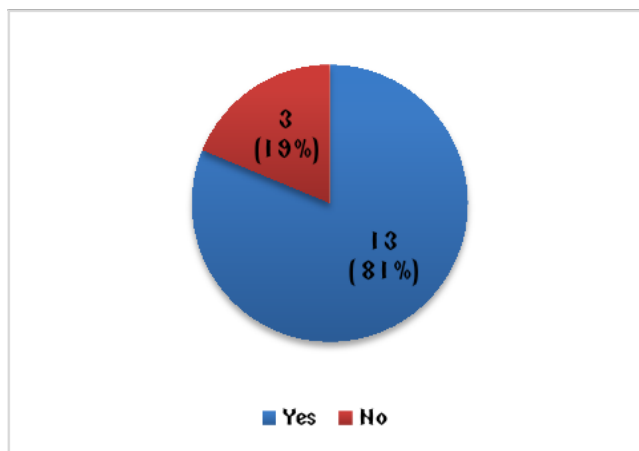
6. Does your library have a library OPAC interface linked to website?

Figure 6: Libraries having a library OPAC interface linked to website

The above pie-chart shows that almost all the librarians have linked their library OPAC interface to their website.

7. Do you know about any mobile technologies/mobile based services used or provided by library?

Figure 7: Librarians who know about any mobile technologies/mobile based services used or provided by library

As can be seen in the above pie-chart that 13 (81%) of the library professionals knows about the mobile technologies/mobile based services used or provided by the library, while 3 (19%) of the library professionals do not know about any mobile technologies/mobile based services used or provided by the library.

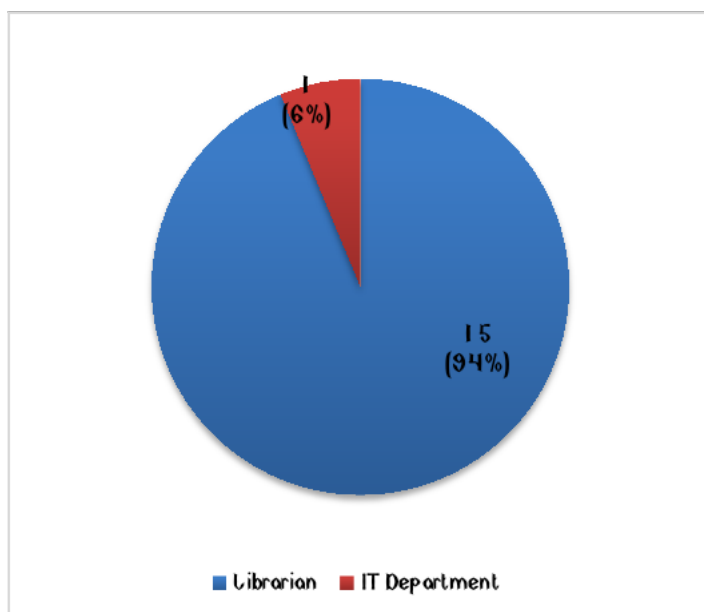8. Who are the personnel that handle your library website?

Figure 8: Personnel that handle your library website

According to the above pie-chart 15 (94%) library professionals claim their library website is managed by the librarian, while 1 (6%) say their library website is managed by the IT department.

9. Does your library provide the following mobile based services?

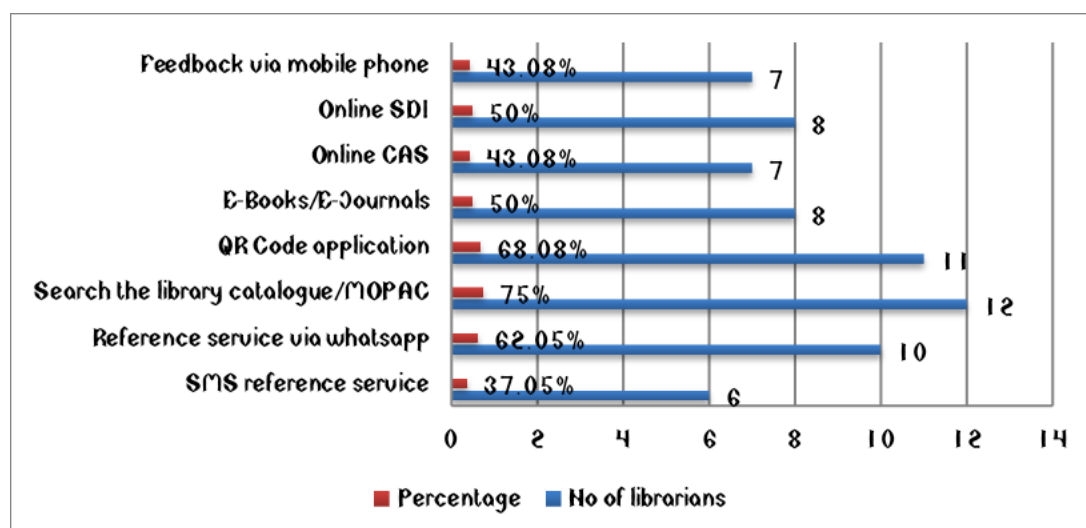*Figure 9: libraries which provides the following mobile based services*

Sr. No.	Particulars	No. of Librarians	Percentage
1.	SMS reference service	6	37.05%
2.	Reference service via WhatsApp	10	62.05%
3.	Search the library catalogue/MOPAC	12	75%
4.	QR code application	11	68.08%
5.	E-books/E-journals	8	50%
6.	Online CAS	7	43.08%
7.	Online SDI	8	50%
8.	Feedback via mobile phone	7	43.08%

Table 1: Libraries providing mobile based services

According to the bar graph and table above, roughly 12(75%) of library professionals provide their patrons to search the library catalog/MOPAC on their mobile phones. QR code application services are provided by 11(68.08%) of libraries. 10(62.05%) of the librarians provide reference services using WhatsApp instant messaging. 8(50%) of library professionals give their clients access to e-books and e-journals via their mobile phones, and also give online CAS to their patrons. Only 7(43.08%)of librarians provide feedback to their clients via mobile phone, while only 6(37.05%) provide SMS reference assistance to their patrons via mobile phone.

10. Does your library have mobile friendly website which allows the users to do the following?
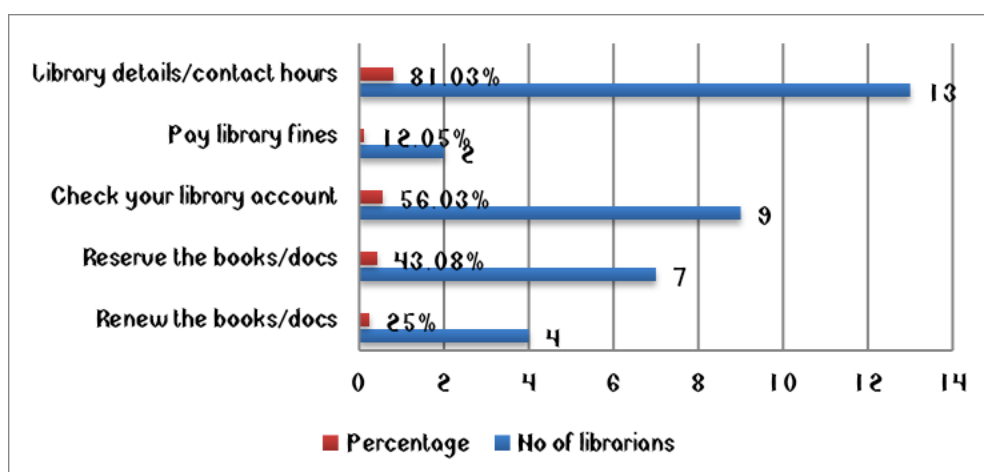
Figure 10: Does your library have mobile friendly website which allow the users to do the following?

Sr. No.	Particulars	No. of librarians	Percentage
1.	Renew the books/documents	4	25%
2.	Reserve the books/documents	7	43.08%
3.	Check your library account	9	56.03%
4.	Pay the library fines	2	12.05%
5.	Library details/contact details	13	81.03%

Table 2: Libraries having mobile friendly website which allow users to do the above services

According to the bar graph and table above, 13(81.03%) of librarians offer a

mobile-friendly website that allows users to view library details and contact hours on their phones. 9(56.03%) of librarians allow their patrons to check their library accounts from their mobile phones. 7(43.08%) of librarians allow their users to reserve books/documents using their mobile phones. Only 2(12.05%) of librarians allow their users to pay library fines from their mobile phones, while 4(25%) of library professionals allow their users to renew books and documents from their mobile phones.

11. How many hits retrieved in your library websites daily?
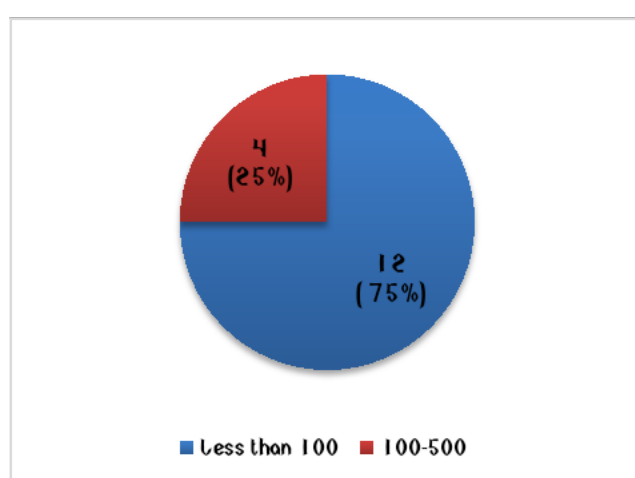
Figure 11: Hits retrieved in your library website daily

The above pie chart shows us that 12 (75%) of the libraries retrieve less than 100 hits in their library website daily, while 4 (25%) of the libraries retrieve 100 -500 hits on their library website.

12. If there is no mobile technology service for the users, is your library interested to take up the mobile services to deliver the best possible services to users?
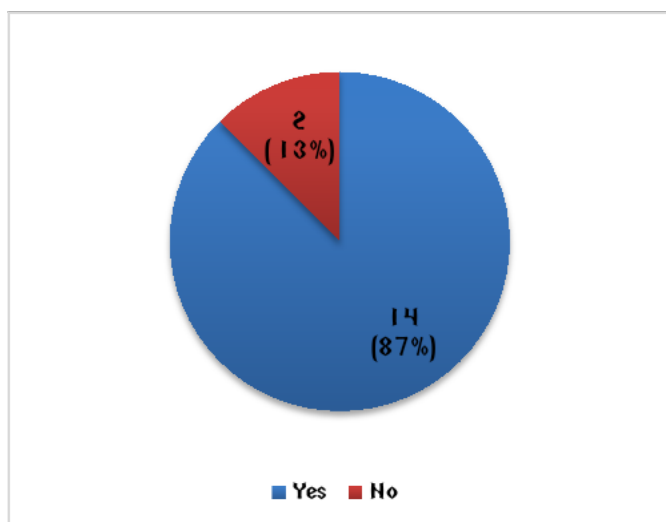
Figure 12: Libraries interested to take up mobile services to deliver the best possible services to users

From the above pie-chart we can ascertain that 14 (87%) of the library professionals are interested to take up the mobile technology services to deliver the best possible services to users, while 2 (13%) of the library professionals are not interested to take up the mobile technology services.

13. If yes, does your library need any training/assistance to use the mobile technology services?
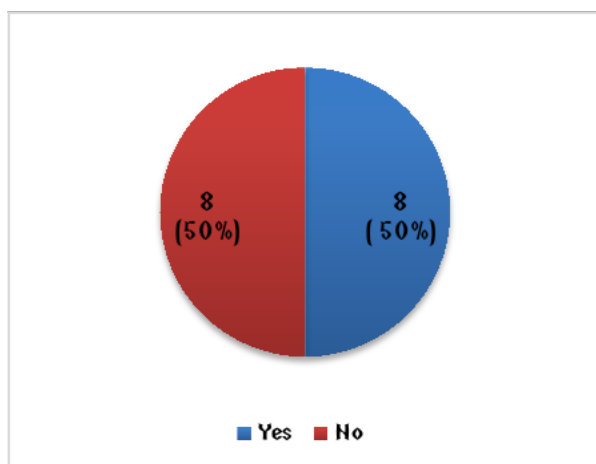
Figure 13: librarians that need any training/assistance to use the mobile technology services

The above pie-chart shows that 8 (50%) of the library professionals need training/assistance to use mobile technology services. 8 (50%) of the library professionals do not need training/assistance to use mobile technology services.

14. Do you think that if library starts using mobile technology services it will increase the following?

Figure 14: Librarians who think that if library starts using mobile technology services it will increase the following

Sr. No.	Particulars	No. of librarians	Percentage
1.	More access to the library	14	87.05%
2.	Usability of information sources	12	75%
3.	Ease to use the library	14	87.05%

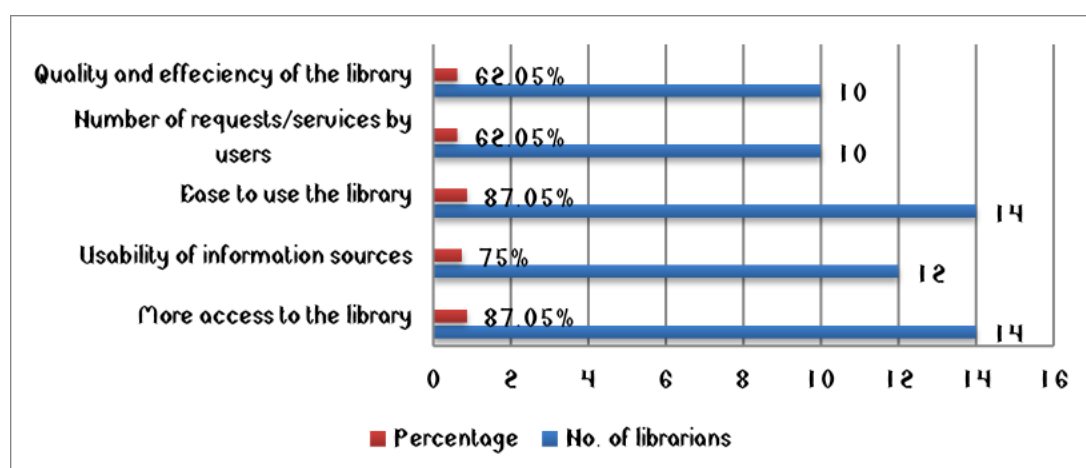|			
4.	Number of requests/services by users	10	62.05%
5.	Quality and efficiency of the library	10	62.05%

Table 3: *Librarians who think if library starts using mobile technology services it will increase the above services*

According to the bar graph and table above, 14 (87.05%) of library professionals believe that if the library begins to use mobile technology services, there will be more access to the library. 14 (87.05%) library professionals believe that the introduction of mobile technology services in libraries there will be ease to use the library. With the introduction of mobile technology services in libraries, 12 (75%) of the library professionals believe that the usability of information sources will improve, while 10 (62.05%) believe that the number of requests/services by users would grow, as well as the library's quality and efficiency.

5.4. User's Analysis

Responses from users: Questionnaires were distributed to the users through google forms as well as through the survey. Questionnaires were given to the undergraduate and postgraduate library users to know their viewpoints on mobile technology in the libraries.

1. Category of the user
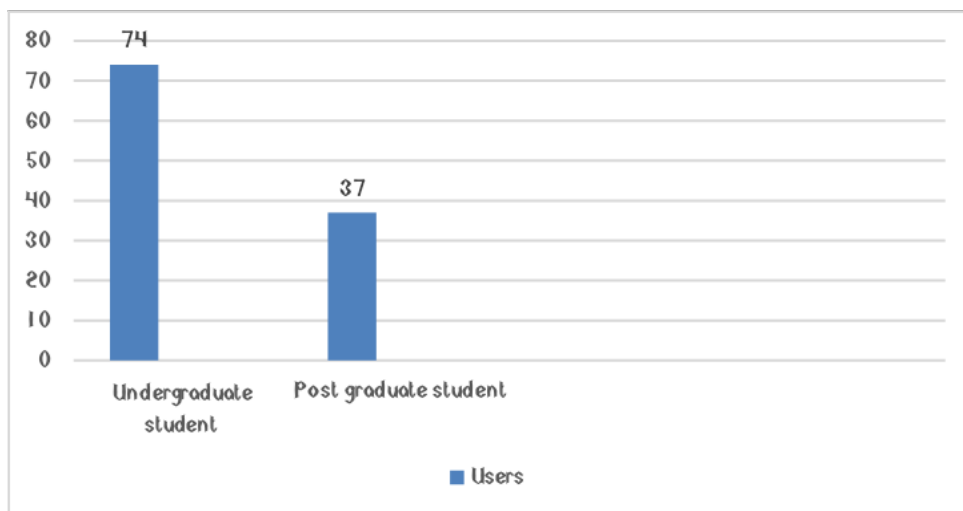
Figure 15: Category of the user

As can be seen in the above chart that 74 are undergraduate users and 37 are postgraduate library users. The objective of this question was to find out the different views between undergraduate users and the postgraduate library users on the mobile technology in libraries in this modern technological era.
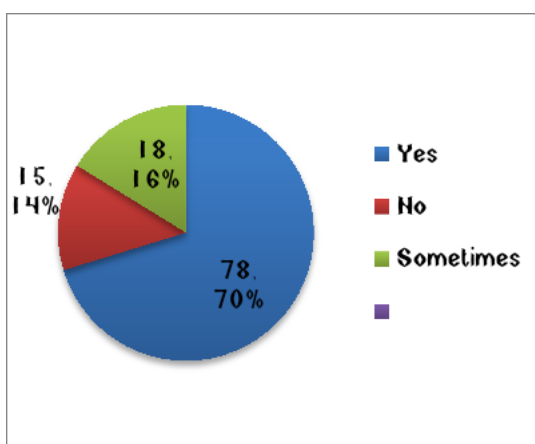
2. Do you have a mobile phone?

Figure 16: Users who have a mobile phone

The above pie chart shows that almost all the library users own a personal mobile phone. The objective of this question was to know if all the users own a mobile phone and to know more about mobile technologies in this view.

3. Do you use mobile phone in the library?

Figure 17: Users who use mobile phone in the library

As can be seen in the above pie chart that 78 (70%) of the library users use their mobile phone in the library. 18 (16%) of the library users use their mobile phone occasionally in the libraries while, 15 (14%) of the users do not use their mobile phone in libraries.

4. Does your library have a library website?
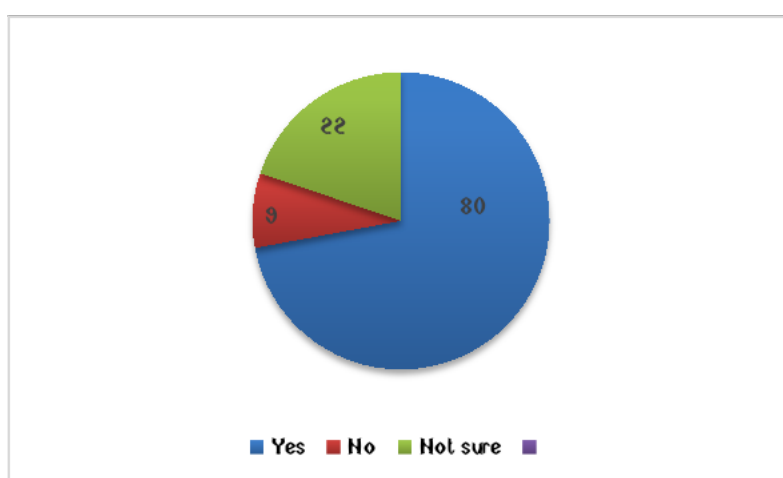
Figure 18: libraries have library website

According to the above pie chart 80 (72%) of the users say that their college library have a library website, while 22 (20%) of the users say that they are not user if their college have a library website, whereas 9 (8%) of the users say that their college library doesn't have a library website.

5. Do you know about the mobile technologies/ mobile based services used or provided by your library?
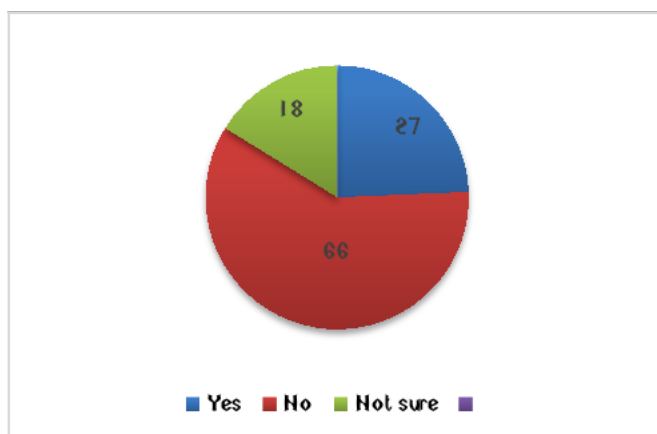
Figure 19: Users who get know about the mobile technologies/mobile based services used or provided by your library

The above pie chart shows that 66 (60%) of the users are not aware about the any mobile technologies or mobile based services used or provided by the library. 27 (24%) of the users knows about the mobile technologies provided by the library, whereas 18 (16%) of the users are not sure about the mobile technologies used or provided by the library.

6. Do you get access to your library 24/7?
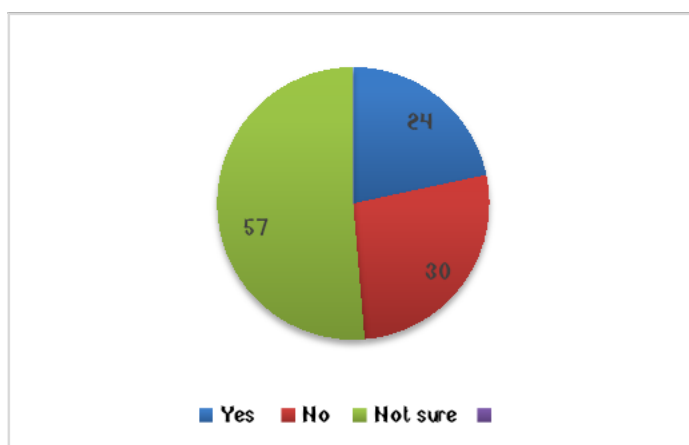
Figure 20: Users who get access to your library 24/7

As can be seen in the above pie chart 57 (51%) of the users say that they are not sure if they get access to their library 24/7, while 30 (27%) of the users say that they do not get access to their library 24/7 and 57 (51%) of the library users say that they get access to their library 24/7.

7. If your library has mobile friendly website, how likely would you use the following?
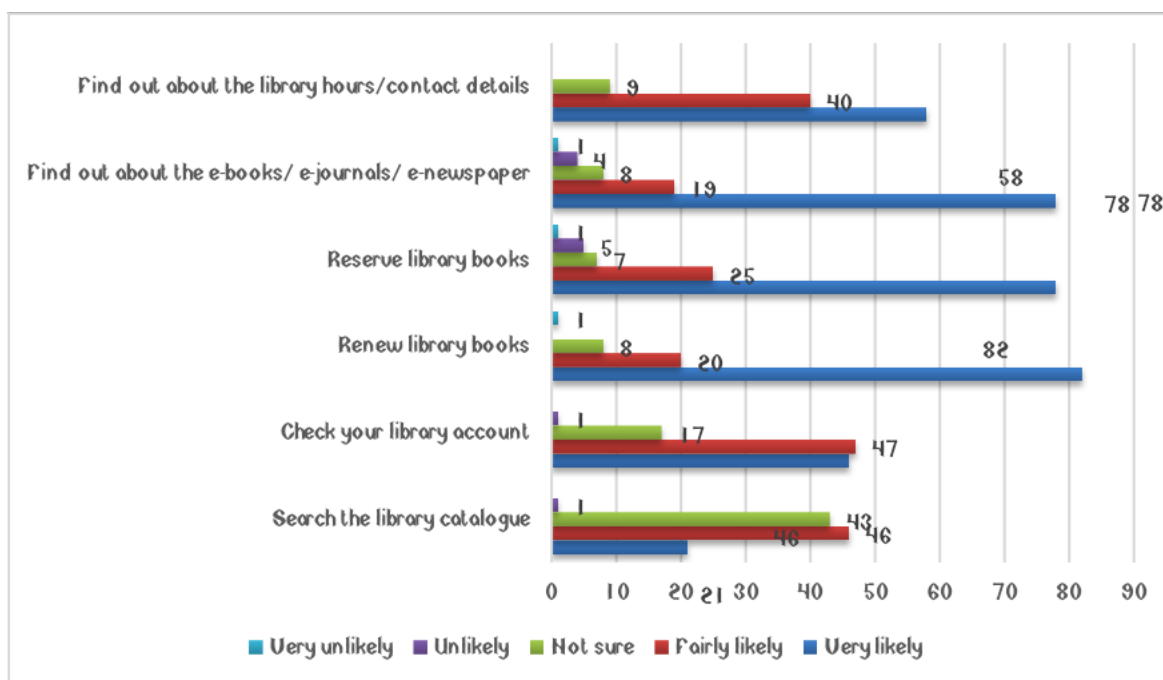
Figure 21:, How likely users would you use mobile friendly library websites

Sr. No.	Particulars	Very Likely	Fairly Likely	Not Sure	Unlikely	Very Unlikely
1.	Search the library catalogue/OPAC	21	46	43	1	
2.	Check your library account	46	47	17	1	
3.	Renew library books	82	20	8		1
4.	Reserve library books	78	25	7		1
5.	Find out about the e-books/e-	78	19	8	5	1

72

	journals/e-newspaper				
6.	Find out about the library hours/contact details	58	40	9	4

Table 4: If their library provides above mobile friendly website how likely users would use them

The above bar graph and table shows that 46 of the library patrons would most likely utilize their mobile devices to search the library catalog/OPAC. 43 users are unsure about accessing the library catalog/OPAC on their mobile phone, whereas 21 users are very likely to search the library catalog/OPAC on their mobile phone and 1 user is unlikely to search the library catalog/OPAC on their mobile phone.

47 of the users say they would use their mobile device to check their library account. 46 of the library users say they would check their account on a mobile device very likely, while 17 say they are unsure, and 1 user claims that checking his library account on his phone is very unlikely.

82 of the users believe they would most likely use their phones to renew library books. 20 users think they would most likely use their mobile phones to renew library books. 8 users said they are unsure to renew their books using their mobile phone. With a mobile phone 1 user is very unlikely to renew books.

78 of the users say that they would use their mobile phone to reserve library books. 25 of the users believe they would most likely reserve library books. 7 users are unsure about using mobile phones to reserve library books, and 1 user would never use a mobile phone to reserve library books.

78 of the users believe they would very likely find out about e-books/e-journals/e-newspapers using their mobile phones. 19 of the users believe they are fairly likely to find out about e-books/e-journals/e-newspapers. 8 of the users are unsure whether they would find out about the e-books/e-journals/e-newspapers on their mobile phones. 5 of the users say they are unlikely to see them on their phone. 1 user claims that he would be very unlikely to find out about e-books/e-journals/e-newspapers.

58 of the users say that they would very likely find out about the library

hours/contact details. 40 of the users say that they would fairly likely find out about the library hours/contact details. While 9 of the users are unsure if they would find out about the library hours/contact details and 4 of the users say they would unlikely find out about the library hours/contact details.

8. If the following mobile based services were introduced, how likely would you use them?
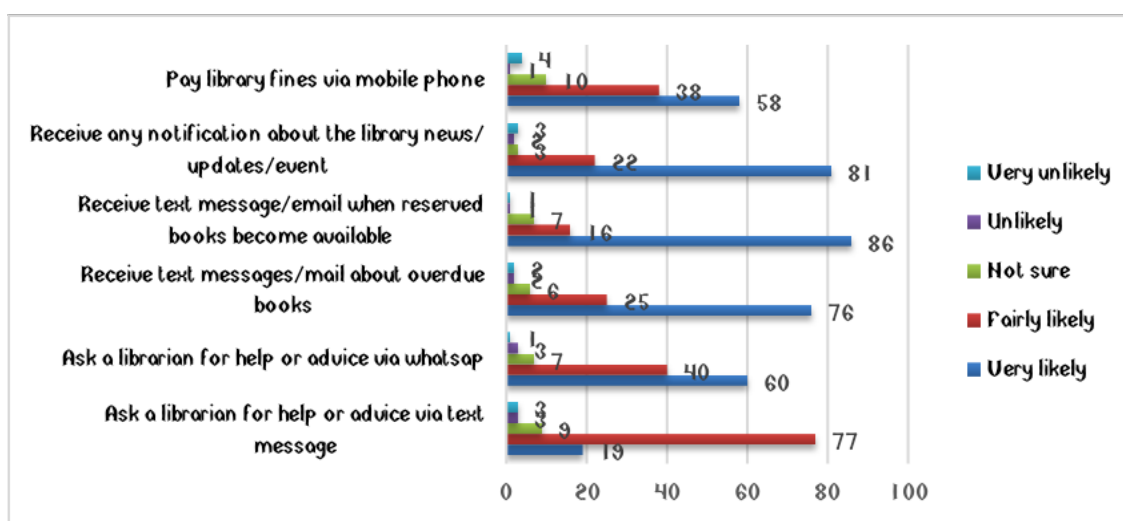
Figure 22: How likely users would use the following mobile based library services

Sr. no.	Particulars	Very likely	Fairly likely	Not sure	Unlikely	Very unlikely
1.	Ask a librarian for help or advice via text message	19	77	9	3	3
2.	Ask a librarian for help or advice via WhatsApp etc.	60	40	7	3	1
3.	Receive text messages/email about overdue	76	25	6	2	2

	books					
4.	Receive text message/email when reserved books become available	86	16	7	1	1
5.	Receive any notification about the library news/updates/event	81	22	3	2	3
6.	Pay library fines via mobile phone	58	38	10	1	4

Table 5: If the above mobile based library services were introduced, how likely would users use them

The above bar graph and table shows that77 of the users would fairly likely ask the librarian for help or advice via text message. 19 users say they would very likely ask the librarian for help or advice via text message while 9 of the users say that they are unsure about asking the librarian for help or advice via text message 3 of the users say that they would unlikely ask a librarian for help/advice via text message and 3 of the users say that they would very unlikely ask a librarian for help or advice via text message.

60 of the users say that they would very likely ask the librarian for help via WhatsApp. 40 users say that they would fairly likely ask the librarian for help via WhatsApp while, 7 of the users are unsure about asking the librarian via WhatsApp. 3 other users say they would unlikely ask the librarian for help over WhatsApp and 1 of the user say that he would very unlikely to ask librarian via WhatsApp.

76 of the users say that they would very likely want to receive text messages/email about overdue books. 25 of the users say that they would fairly likely want to receive text messages/email about overdue of books while, 6 of the users are unsure about receiving text messages/email about overdue of books. 2 of the users say that they would unlikely want to receive text messages/emails about overdue of books and 2 of the users say that they would very unlikely want to receive text messages/emails about the overdue of books in the library.

86 of the users say that they would very likely want to receive text messages/emails when reserved books become available. While 16 of the users say that they would fairly likely want to receive text messages/emails when reserved books become available. 7 of the users say that they are unsure about receiving text messages/ email when reserved books become available. 1 of the user say that he would unlikely want to receive text messages/emails when reserved books become available and 1 of the user would very unlikely want to receive text messages/emails when reserved books become available.

81 of the users say that they would very likely want to receive notifications about the library news/updates/events while 22 of the users say that they would fairly likely want to receive notifications about the library news/updates/events. 3 of the users say that they are unsure about receiving any notifications about the library on their mobile phone. 3 other users say that they would very unlikely want to receive any notifications about the library news/updates/events and 2 of the users feel unlikely to receive any notifications about the library news/updates/events.

58 of the users would very likely want to pay the library via mobile phones while 38 of the users would fairly likely want to pay the library fines via mobile phones. 10 of the users are unsure about paying the library fines via mobile phones. 4 of the users ay that they would very unlikely want to pay the library fines via mobile phone and 1 of the user say he would unlikely want to pay the library fines via mobile phones.

9. Do you take picture/photocopy of library books/documents with your mobile phone instead of issue the particular books/documents?
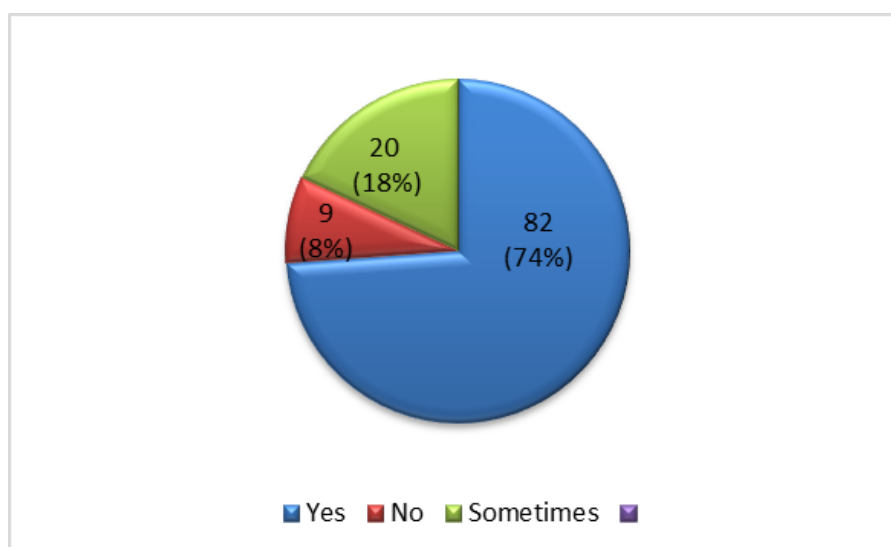
Pie chart showing: 82 (74%) Yes, 9 (8%) No, 20 (18%) Sometimes.
Legend: Yes | No | Sometimes

As can be seen in the above pie chart that 82 (74%) of the library users take picture/photocopy of library books/documents with their mobile phone instead of issue the book/document in the library. 20 (18%) of the library users say that they take the picture/photocopy of the book/document occasionally with their mobile phone while, 9 (8%) of the library users say that they prefer issuing the book/document instead of taking the picture of the books/document with their mobile phone.

10. Do you know what a QR code is?
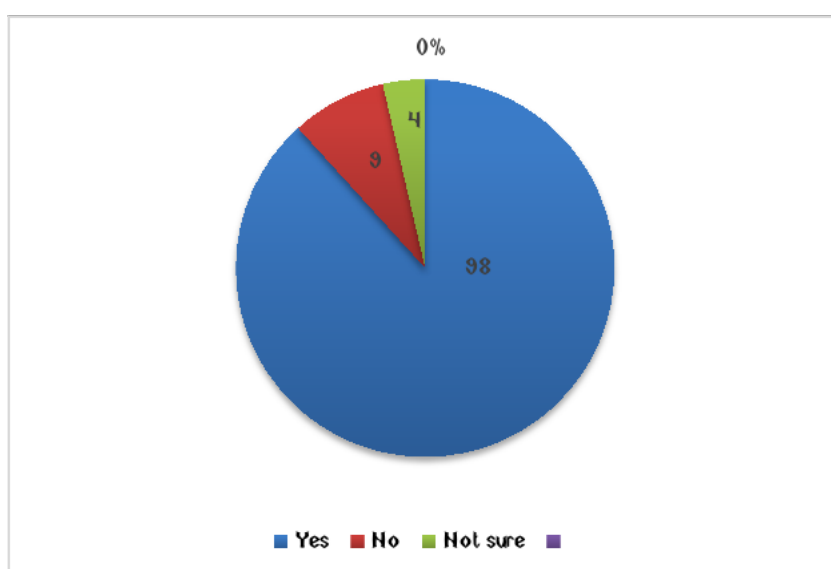
Figure 24: Users who know about QR code

From the above pie-chart we can say that 98 (88%) of the library users knows what a QR code is while, 9 (8%) of the users do not know what is QR code is and 4 (4%) of the users say that they are not sure about a QR code.

11. If yes, have you ever scanned a QR code with your mobile device in library?
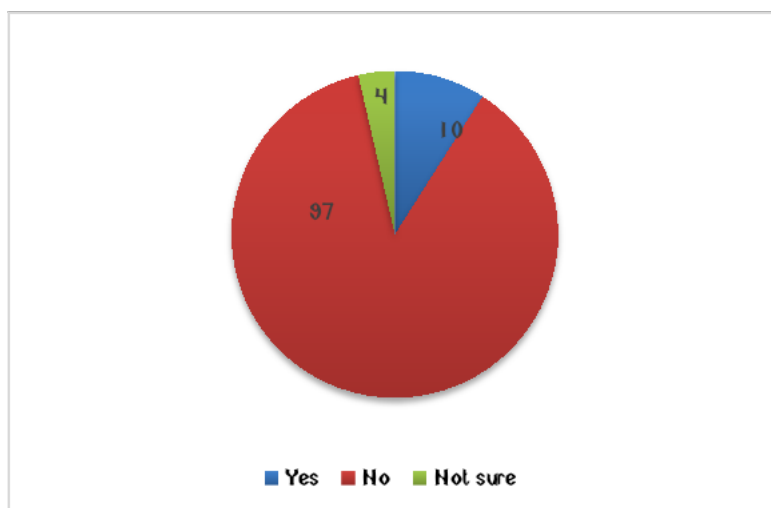
Figure 25: Users who have scanned QR code with their mobile phone in the library

The above pie-chart shows that 97 (87%) of the library users have never scanned a QR code with their mobile device in the library whereas, 10 (9%) of the library users have scanned a QR code with their mobile phone in the library and 4 (4%) of the library users say that they are not sure if they have scanned the QR code with their mobile phone in the library.

12. If your library starts using mobile technology would you like to receive training/assistance to use the mobile application?
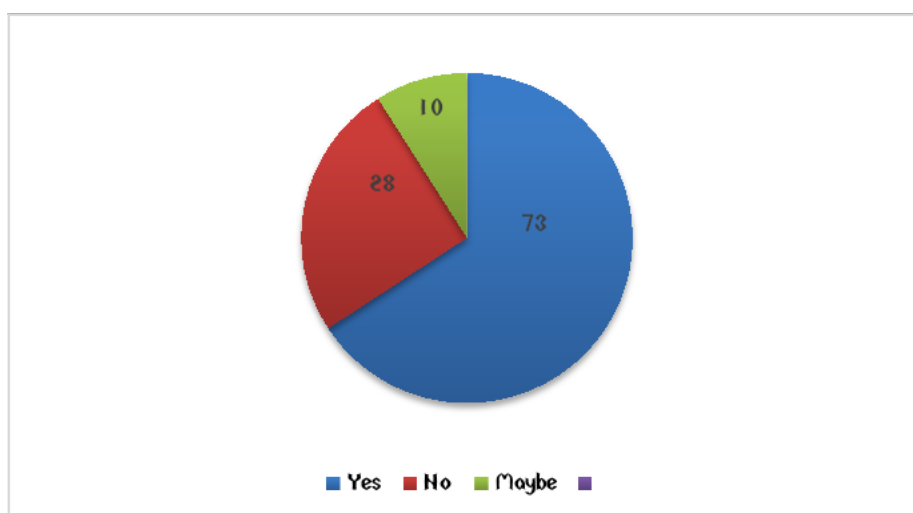
Figure 26: Users who would like to receive training/assistance to use the mobile application

From the above pie chart we can ascertain that 73 (66%) of the library are interested to receive the training/assistance to use mobile application in libraries while, 28 (25%) of the library users are not interested in taking up the training and 10 (9%) of the library users say that they may-be interested in taking up the training/assistance to use mobile application in libraries.

Chapter VI

Findings, Suggestions and Conclusion

6. Chapter VI: Findings, Suggestions and Conclusion

6.1. Introduction

This chapter focuses on the data interpretation's results, recommendations and conclusion. This chapter investigates the data of 'library professionals' and the 'library users' perspectives on the use of mobile technology in improving the quality of library services in current technological modern era.

The purpose of this study is to determine the use and usage of mobile technology in libraries, as well as their long-term advantages to the library professionals and the library users in North and South districts of Goa.

The findings are collated and listed below, based on the replies to the questionnaire from library professionals and the library users.

6.2 Findings from Librarian's Responses

1. The study showed that all the library professionals own a smart-phone phone. The objective of this question was to find out if all the library professionals own a smart-phone and, if so, to learn about mobile technologies in this context.

2. It is observed that 81% of the library professionals use their mobile phones in the library whereas 19% of the library professionals do not use the mobile phones in the library.

3. The study showed that 62% of the library professionals allow their users to use mobile phones in the library while 38% of the library professionals do not allow at all.

4. It has been noticed that 94% of the library professionals say that they have proper internet Wi-Fi facilities in their libraries whereas 6% of the library professionals say that there are no proper internet facilities in their libraries.

5. It has been observed that almost all the libraries have library OPAC linked to their website for mobile viewing.

6. The study showed that 81% of the librarians know about the mobile technologies/mobile based services used or provided by their library whereas 19% of the librarians do not know about the mobile technologies or mobile based services used or provided by their library.

7. It is observed that 75% of the librarians allow their patrons to search the library catalogue/MOPAC on their mobile phones. QR code application services are provided by 68.08% of libraries.62.05% of the librarians provide reference services using WhatsApp instant messaging. 50% of library professionals give their clients access to e-books and e-journals via their mobile phones, and also give online CAS to their patrons. Only 43.08%of librarians provide feedback to their clients via mobile phone, while only 37.05% provide SMS reference assistance to their patrons via mobile phone.

8. It is observed that 75% of the libraries retrieve less than 100 hits in their library website daily, while 25% of the libraries retrieve 100-500 hits on their library website.

9. It is noticed that 81.03% of librarians offer a mobile-friendly website that allows users to view library details and contact hours on their phones. 56.03%of librarians allow their patrons to check their library accounts from their mobile phones. 43.08% of librarians allow their users to reserve books/documents using their mobile phones. Only 12.05% of librarians allow their users to pay library fines from their mobile phones, while 25% of library professionals allow their users to renew books and documents from their mobile phones.

10. The study also showed that 87% of the library professionals are interested to take up the mobile technology services to deliver the best possible services to users, while 13% of the library professionals are not interested to take up the mobile technology services.

11. It is observed that 50% of the library professionals need training/assistance to use mobile technology services. 50% of the library professionals do not need training/assistance to use mobile technology services.

12. It is noticed that 87.05%of library professionals believe that if the library begins to use mobile technology services, there will be more access to the library. 87.05% library professionals believe that the introduction of mobile technology services in libraries there will be ease to use the library. With the introduction of mobile technology services in libraries,75% of the library professionals believe that the usability of information sources will improve, while 62.05% believe that the number of requests/services by users would grow, as well as the library's quality and efficiency.

6.3 Findings from the user's responses

1. It is observed that almost all the library users own a personal mobile phone.

The objective of this question was to know if all the users own a mobile phone and to know more about mobile technologies in this view.

2. The study shows that 70% of the library users use their mobile phone in the library. 16%of the library users use their mobile phone occasionally in the libraries while, 14% of the users do not use their mobile phone in libraries.

3. It has been found that 72% of the users say that their college library has a library website, while 20% of the users say that they are not user if their college have a library website, whereas 8%of the users say that their college library doesn't have a library website.

4. It is noticed that 60% of the users are not aware about the any mobile technologies or mobile based services used or provided by the library.24% of the users knows about the mobile technologies provided by the library, whereas 16% of the users are not sure about the mobile technologies used or provided by the library.

5. It is observed that 51% of the users say that they are not sure if they get access to their library 24/7, while 27%of the users say that they do not get access to their library 24/7 and 51% of the library users say that they get access to their library 24/7.

6. The study shows that 46 of the library patrons would most likely utilize their mobile devices to search the library catalog/OPAC. 43 users are unsure about accessing the library catalog/OPAC on their mobile phone, whereas 21 users are very likely to search the library catalog/OPAC on their mobile phone and 1 user is unlikely to search the library catalog/OPAC on their mobile phone.

47 of the users say they would use their mobile device to check their library account. 46 of the library users say they would check their account on a mobile device very likely, while 17 say they are unsure, and 1 user claims that checking his library account on his phone is very unlikely.

82 of the users believe they would most likely use their phones to renew library books. 20 users think they would most likely use their mobile phones to renew library books. 8 users said they are unsure to renew their books using

their mobile phone. With a mobile phone 1 user is very unlikely to renew books.

78 of the users say that they would use their mobile phone to reserve library books. 25 of the users believe they would most likely reserve library books. 7 users are unsure about using mobile phones to reserve library books, and 1 user would never use a mobile phone to reserve library books.

78 of the users believe they would very likely find out about e-books/e-journals/e-newspapers using their mobile phones. 19 of the users believe they are fairly likely to find out about e-books/e-journals/e-newspapers. 8 of the users are unsure whether they would find out about the e-books/e-journals/e-newspapers on their mobile phones. 5 of the users say they are unlikely to see them on their phone. 1 user claims that he would be very unlikely to find out about e-books/e-journals/e-newspapers.

58 of the users say that they would very likely find out about the library hours/contact details. 40 of the users say that they would fairly likely find out about the library hours/contact details. While 9 of the users are unsure if they would find out about the library hours/contact details and 4 of the users say they would unlikely find out about the library hours/contact details.

7. 77 of the users would fairly likely ask the librarian for help or advice via text message. 19 users say they would very likely ask the librarian for help or advice via text message while 9 of the users say that they are unsure about asking the librarian for help or advice via text message 3 of the users say that they would unlikely ask a librarian for help/advice via text message and 3 of the users say that they would very unlikely ask a librarian for help or advice via text message.

60 of the users say that they would very likely ask the librarian for help via WhatsApp. 40 users say that they would fairly likely ask the librarian for help via WhatsApp while, 7 of the users are unsure about asking the librarian via WhatsApp. 3 other users say they would unlikely ask the librarian for help over WhatsApp and 1 of the user say that he would very unlikely to ask librarian via WhatsApp.

76 of the users say that they would very likely want to receive text messages/email about overdue books. 25 of the users say that they would fairly likely want to receive text messages/email about overdue of books while, 6 of the users are unsure about receiving text messages/email about overdue of books. 2 of the users say that they would unlikely want to receive text messages/emails about overdue of books and 2 of the users say that they would very unlikely want to receive text messages/emails about the overdue of books in the library.

86 of the users say that they would very likely want to receive text messages/emails when reserved books become available. While 16 of the

users say that they would fairly likely want to receive text messages/emails when reserved books become available. 7 of the users say that they are unsure about receiving text messages/ email when reserved books become available. 1 of the user say that he would unlikely want to receive text messages/emails when reserved books become available and 1 of the user would very unlikely want to receive text messages/emails when reserved books become available.

81 of the users say that they would very likely want to receive notifications about the library news/updates/events while 22 of the users say that they would fairly likely want to receive notifications about the library news/updates/events. 3 of the users say that they are unsure about receiving any notifications about the library on their mobile phone. 3 other users say that they would very unlikely want to receive any notifications about the library news/updates/events and 2 of the users feel unlikely to receive any notifications about the library news/updates/events.

58 of the users would very likely want to pay the library via mobile phones while 38 of the users would fairly likely want to pay the library fines via mobile phones. 10 of the users are unsure about paying the library fines via mobile phones. 4 of the user say that they would very unlikely want to pay the library fines via mobile phone and 1 of the user say he would unlikely want to pay the library fines via mobile phones.

8. It is noticed that 74%of the library users take picture/photocopy of library books/documents with their mobile phone instead of issue the book/document in the library. 18%of the library users say that they take the picture/photocopy of the book/document occasionally with their mobile phone while, 8% of the library users say that they prefer issuing the book/document instead of taking the picture of the books/document with their mobile phone.

9. It is showed that 88% of the library users knows what a QR code is while, 8%of the users do not know what is QR code is and 4%of the users say that they are not sure about a QR code.

10. It is observed that 87% of the library users have never scanned a QR code with their mobile device in the library whereas, 9% of the library users have scanned a QR code with their mobile phone in the library and 4% of the library users say that they are not sure if they have scanned the QR code with their mobile phone in the library.

11. It is noticed that 66% of the library are interested to receive the training/assistance to use mobile application in libraries while, 25% of the library users are not interested in taking up the training and 9% of the library users say that they may-be interested in taking up the training/assistance to use mobile application in libraries.

6.4 Suggestions

1. There is an urgent need to implement the mobile technology in libraries to cater to the needs of all the users living in the society.

2. As new generations are more suitable to advanced technology, mobile service facilities should be encouraged and introduced in libraries as it saves time of the users while providing precise information when needed.

3. Developing a mobile app for the users to access library resources can be a smart move.

4. The management should train librarians on the role and usage of mobile devices, as well as the adoption and use of mobile technology in libraries and as a result of this they will be able to fully appreciate and support the use of mobile technology in libraries.

5. The patrons of the library should also be given some form of training/instructions on how to use mobile technologies to access library materials.

6. Libraries, whether public or academic, should make an effort to build or design and upload an online virtual tour video of their website so that users are aware of the different sources and where they are situated even from their mobile phone.

7. There hasn't been much done to raise awareness among library users about the mobile technologies utilized in libraries, there is a need to do so through library orientation and other activities.

8. The library professionals can make it a point to provide access to open access materials such as e-books, databases, e-journals, and other resources that the library subscribes to in the library and on campus so that students can use these resources at any time using their mobile devices.

9. The library automation and administration software must be integrated with the mobile technology interface since it computerizes all library functions such as acquisition, categorization, cataloguing and circulation. SMS notification, check-in/out notification, overdue notification, and more features are included into this software. This integrated library management software gives notifications to each user individually.

10. While there is a lot of debate about offering users outside the library online access, there is always a risk to their privacy, and the reader's usage

information can be utilised, so there is a need to appropriately manage the reader's privacy.

6.5 Conclusion

New technologies and tools are being developed on a daily basis to meet the needs of its users. Users now demand for easy and fast access to pertinent information this has created pressure on the library professionals and this is the reason why libraries have to reconfigure their existing traditional services and adapt to mobile-based services. Libraries and other information centres can now employ a variety of tools and approaches to distribute information to users at the proper time and with the least amount of effort. This dissertation mainly focused on the applications and use of mobile technologies in libraries. The study also examines the perception of the library professional and users of the libraries on the application and use of mobile technologies in improving library service quality.

However, there is a need to raise awareness about the value of mobile technologies in libraries so that users can fully utilize their mobile devices as library resources while sitting at home. To ensure the successful deployment of mobile-based technology, personal or institutional training is required. To be functional in libraries the library professionals must overcome numerous challenges with mobile technology, particularly in developing countries like ours where they may be financial constraints, a lack of resources, and a lack of awareness of mobile technologies and how to implement them properly for smooth operation.

By going mobile, a library takes a giant step toward becoming a round-the-clock service. Vollmer (2010).

Bibliography

Saxena, A. (2013). *Impact of mobile technology on libraries: A descriptive study*. International Journal of Digital Library Services, 3(4), 1.

Roy, M. & Kumar, N. (2017). *Application of Mobile Technology in Library Services*. International Journal of Information Movement, 2(7).

Nalluri, S. & Gaddam, B. (2016). *Mobile Library Services and Technologies: A Study*, International Journal of Research in Library Science, 2(2), 59.

Verma, K.M. & Verma, K.N. (2014). *Application of mobile Technology in the Libraries*. (Conference paper). Libraries towards Digital Paradigm, Faizabad, India.

Kumbhar, S. & Pawar, R. (2014). *Mobile Based Services: Application & Challenges*. (Conference paper). Changing Trends in Academic Libraries and Librarianship in Digital Environment, Shivaji University, Kolhapur.

Roy, M. & Kumar, N. (2017). *Application of Mobile Technology in Library Services*. International Journal of Information Movement, 2(7).

Singh, K. & Nikandia, P. (2017). Role *of Mobile Technology and Their Application in Library Services in Digital Era*. International Research: Journal of Library and Information Science, 7(1).

Anyim, Wisdom O. (2020). *Application of Mobile Technologies for Access and Retrieval of Information in Emergency Situation: An Eye Opener for Libraries and Information Users*. Journal of Computer Science and Technology Studies, 1(2).

Panda, S. (2020). *Mobile Librarianship: An Initiative of New Normal*. International Research Journal of Multidisciplinary Studies, 9(6).

Saxena, A. & Yadav, R. D. (2013). *Impact of Mobile Technology on Libraries: A Descriptive Study*. International Journal of Digital Library Services, 3(4).

Kumar, S. & D, K. (2013). *Application of Mobile Technology in Library Services: A*

Review. 9ᵗʰ International Caliber 2013.

K, H. (2004). *Application of Wireless Technologies in Libraries*. 2ⁿᵈ International Caliber 2004.

Negi, D. (2014). *Using Mobile Technologies in Libraries and Information Centers*. Library Hi Tech News, 31(5).

Maideen, S. (2017). *Mobile Technology for Academic Libraries: An Overview*. (Conference paper) Emerging Trends in Library and Information Science, Skyline University, UAE.

Sharma, D. & Sahoo, R. (2014). *Application of Mobile Technology in Library Services: An Overview*. International Journal of Information Technology and Library Science, 3(1).

Bhoj, S. (2020). *Mobile Based Library Services*. Indian Journal of Library Science and Information Technology, 5(2).

Kumar, R. (2017). *Implementation of Mobile Based Library Services and Technologies in Libraries*. World Wide Journal of Multidisciplinary Research and Development, 3(6).

Wadhwa, V. (2019). *Library in Hands: Incorporating Mobile Technology into Library*. Journal of Advances and Scholarly Researches in Allied Education, 16(2).

Ram, B. & Singh, K. (2020). *Innovative Library Services in Mobile Technology: A Recent Approach*. International Journal of Information Dissemination and Technology, 10(4).

Soni, (2019). *Libraries in Hand: An Impact of Mobile Technology on Library Services*. (Conference paper) Library and Information Services: Emerging Digital Paradigm, Ghaziabad, U.P.

Nagarkar, S. (2013). *Use of Mobile Technology in Library Services*. Indian Streams Research Journal, 3(11).

Nalluri, S. & Gaddam, B. (2016). *Mobile Library Services and Technologies: A Study*. International Journal of Research in Library Science, 2(2).

Karadia, A. & Seth, A. (2015). *Mobile Technology in Libraries for Discovering E-resources and Services*. (Conference paper) Design and implementation of library automation using Koha, Jawahar Navodaya Vidyalaya, Boudh.

Dei, J. (2020). *Assessing Adoption and Implementation of Mobile Technology-Based Library services in Academic Libraries*. International Journal of Innovative Technology and Exploring Engineering, 9(3).

Shrivastav, S. (2015). *Use of Mobile Technology in Library and Information Services*. American Research Thoughts, 1(7).

T, M. (2016). *Library Mobile Apps: For Effective Services of Library*. Journal of Library

and Information Communication Technology, 5(2).

M, S. & Dange, J. (2017). *Library Services through Mobile Technology*. International Multidisciplinary E-journal, 6(5).

Kumar, S. (2013). *Mobile Phones: A New Dimension in Library Services*. International Journal of Library Science, 7(1).

Murphy, J. (2014). *Mobile Devices and Library: Handheld Tech*, Handheld Reference. Routledge.

Ocran, T. (2017). Implantation of Mobile Technology Based Library Services: A Case Study of University of Cape Coast, University of Pretoria.

Acheampong, & Dei. (2020). *Management Preparedness towards the Implantation of Mobile Technology Library Services in Academic Libraries*. Library Philosophy and Practice, 1-11.

Buruga, B. (2016). *The Use of Mobile Technologies for Social Media* based Service Delivery at Muni University library. University of Pretoria.

Gleason, A. (2015). *Mobile Technologies for Every Library.* Rowman & Littlefield.

Peters, T. & Bell, L. (2013). *The Handheld Library: Mobile Technology and the Librarian.* ABC-CL10.

Soni, N. & Sudan, U. (2015). *Usage & Awareness of Mobile Applications and Technology by LIS Professional in Library Services: Special Reference to North-West part of Madhya Pradesh*. 10th International CALIBER-2015, 298-305.

Kari, H. (2019). *Libraries and Mobile Technologies: An Assessment of the Deployment of the Mobile Technologies in Libraries*. Global journal of library and information science, 2 (16), 1-9.

Kapondera, S. & Ngalande, E. (2020). *Adoption of Mobile Technology in Malawian Academic Libraries: the case of Mzuzu University*. (Conference paper), 165-174.

Shonhe, L. & Jain, P. (2017). *Information Dissemination in the 21st Century: The Use of Mobile Technologies*. Information and knowledge for competitive, university of Botswana, Gaborone.

Liu, Y. & Briggs, S. (2015). *A library in the palm of your hand: mobile services in top 100 university libraries*. Information technology and libraries, 371-381.

Madhusudhan, M. & Dar, S. (2017). *Mobile information services and initiatives in university libraries: A new way of delivery of information*. Journal of library and info. Technology, 37(2), 109-118.

Sahoo, S. (2019). *Transformation of academic library service in the purview of the*

mobile technology. Journal for all subjects, 8940, 1-7.

Wani, S. (2019). *Mobile library and services: A new trend in libaray & information science*. Asia Pacific journal of library management and info. Technology, 5(1), 1-4.

Acheampong, E & Dei, J (2020*). Investigation into the challenges associated with the delivery of library services on mobile tech. platform*. IAFOR journal of literature & librarianship, 9(1), 78-92.

Rawlins, B. (2014). *Mobile devices: A practical guide for librarians*. Rowman & Littlefield.

Lyabode, A., Adetoro, N. & Eniloa, S. (2014). *Mobile technology and information services provision: Preception of library users in selected universities*. Global Educational journal of library & information science, 2(2) 37-50.

Gibson, J. & Nmecha, A. (2020). *Role of libraries in dissemination information on corona virus disease in Nigeria*. Academic journal of current research, 7(11) 11-19.

Siregar, A. & Dewiyana, H. (2018). *Mobile technology for expansion of service range Medan public library.* Journal of physics: conference series, 978(1), 1-5.

Gholami, Z, Abdekhoda, M. & Gavgani, V. (2018). *Determinant factors in adopting mobile technology based services by academic librarians*. DESIDOC journal of library & information technology, 38(4), 271-277.

Kenchakkanavar, H. & Kenchakkanavar, A. (2015). *Mobile technology based information services in the digital world.* International journal of development research, 5(9), 5474-5477.

Damilola, A. & Okesanya, R. (2019). *Use of mobile technology for provision of reference services in Nigeria university libraries*. Library philosophy and practice 29(2).

George, B., Maina, J. & Wanangeye, L. (2016). *Analyzing the use of mobile phone technology in access and utilization of library resources in Mount Kenya University, Kisii campus*. World journal of computer application and technology, 4(1), 15-21.

Mishra, A., Jha, J. & Umre, S. (2017). *Mobile app and the library services*. International journal of information libraries & society, 6(1), 27-32.

Potnis, D., Harms, R. & Cortez, E. (2016). *Identifying key steps for developing mobile applications and mobile website for libraries*, Information technology and libraries 35(3), 43-62.

Singh, K. & Ram, B. (2020). *Innovative Library Services in Mobile Technology: A Recent Approach*, International journal of information dissemination and technology, 10(4), 192 -193.

https://dictionary.cambridge.org

Chang, C.C., Tseng, J.S., & Yan, C.F. (2012). *Perceived Convenience in an Extended Technology Acceptance Model: Mobile Technology and English Learning for College Students*. Australian Journal of Educational Technology, 28(5), 809-826.

Adeeb, M.A., & Hussain, I. (2009). *Role of Mobile Technology in Promoting Campus-Wide Learning Environment*. The Turkish Online Journal of Educational Technology, 8(3), 48-57.

Kumar, R. (2017*). Implementation of Mobile Based Services and Technologies in Libraries*; World Wide Journal of Multidisciplinary Research and Development, 3(6), 103.

American Research Institution. (2016). *Mobile Technology*. The Brookings Research Institution.

Dei, J. (2020). *Assessing Adoption and Implementation of Mobile Technology- Based Library Services in Academic Libraries*; International Journal of Innovative Technology and Exploring Engineering, 9(3), 1670-1671.

https://www.pactworld.org

Annexure

Questionnaire for Librarians

Questionnaire for Librarians'

"Mobile Technology and Services its Facilities and Challenges in Modern Era:

An Evaluative Study"

Name:

Gender:

Institute/College name:

1. Do you have smart mobile phone? (please tick)

   a) Yes ☐

   b) No ☐

2. If yes, how long do you use the mobile phone? (please tick)

a) Less than 1hour a day ☐

b) 1-2 hour a day ☐

c) 4-5 hour a day ☐

d) More than 5 hours ☐

3. Do you use mobile phone in library? (please tick)

   a) Yes ☐

   b) No ☐

4. Do you allow patrons to use mobile phone in your library? (please tick)

   a) Yes ☐

   b) No ☐

5. Does your library have proper internet/Wi-Fi facilities? (please tick)

   a) Yes ☐

   b) No ☐

6. Does your library have a library website which has responsive design for mobile device viewing? (please tick)

a) Yes ☐

b) No ☐

7. Does your library have a library have OPAC interface linked to library website? (please tick)

a) Yes ☐

b) No ☐

8. Do you know about any mobile technologies/mobile based services used or provided by library? (please tick)

a) Yes ☐

b) No ☐

9. Who are the personnel that handle your library website? (please tick)

a) Librarian ☐

b) Library assistant ☐

c) Other library staff ☐

d) IT department/section ☐

e) Administration office ☐

10. Does your library provide the following mobile based services? (please tick)

a) SMS reference service ☐

b) Reference services by instant messages ☐

   (e.g. WhatsApp etc)

c) Search the library catalogue/MOPAC ☐

d) QR code application ☐

e) E-books /E-journals ☐

f) Online CAS via mobile phone ☐

g) Online SDI via mobile phone ☐

h) Online document delivery services/ ☐

mobile document supply

i) Feedback via mobile phone ☐

11. Does your library have a mobile friendly website, which allow the users to do the following? (please tick)

a) Renew the books/documents ☐

b) Reserve the books/documents ☐

c) Check your library account ☐

d) Pay the library fines ☐

e) Library details/contact/hours ☐

12. Who are the target users of your library mobile based services? (please tick)

a) Students ☐

b) Faculty ☐

c) Non-faculty ☐

d) Researcher/scholar ☐

e) Other ☐

13. How many hits retrieved in your library websites daily? (please tick)

    a) Less than 100 ☐

    b) 100-500 ☐

    c) 500 1000 ☐

    d) Above 1000 ☐

14. Does your library have QR code application? (please tick)

    a) Yes ☐

    b) No ☐

15. If there is no mobile technology service for the users, is your library interested to take up the mobile technology services to deliver the best possible services to users? (please tick)

    a) Yes ☐

    b) No ☐

16. If yes, does your library need any training/assistance to use the mobile technology services? (please tick)

    a) Yes ☐

    b) No ☐

17. If your library starts mobile friendly services to users, then what are the different services you would like to have in your library? (please tick)

    a) SMS reference services ☐

    b) Reference services via WhatsApp ☐

c) Search the library catalogue/OPAC ☐

d) E-books/E-journals ☐

e) QR code application ☐

f) Feedback via mobile phones ☐

g) Online CAS via mobile phone ☐

h) Online SDI via mobile phone ☐

18. Do you think that if library starts using mobile technology services it will increase the following? (please tick)

a) More access to the library ☐

b) Usability of information sources ☐

c) Ease to use the library ☐

d) Number of request/services by users ☐

e) Quality and efficiency of the library ☐

19. Any comments/suggestions?

Questionnaire for users

Questionnaire for Users'

"Mobile technology and Services its Facilities and Challenges in Modern Era:

An Evaluative Study"

Name:

Gender:

Age:

Institute/College name:

1. Class/ category (please tick)

    a. Undergraduate Student   ☐

    b. Graduate Student   ☐

    c. Faculty   ☐

    d. Researcher   ☐

    e. Postgraduate   ☐

    f. Corporate User   ☐

2. Do you have smart mobile phone? (please tick)

    a. Yes ☐ b. No ☐

3. If yes, how long do you use the mobile phone? (please tick)

    a. Less than 1 hour a day   ☐

    b. 1-2 hours a day   ☐

    c. 4-5 hours a day   ☐

    d. More than 5 hours a day ☐

4. Do you use phone in library? (please tick)

    a. Yes ☐ b. No ☐

5. Does your library have proper internet/ Wi-Fi facilities?(please tick)

    a. Yes ☐ b. No ☐

6. Does your library have a library website? (please tick)

   a. Yes ☐ b. No ☐

7. Do you know about the mobile technologies/mobile based services used or provided by your library? (please tick)

   a. Yes ☐ b. No ☐

8. Do you get the access to your library 24/7? (please tick)

   a. Yes ☐ b. No ☐

9. If your library has mobile friendly website, how likely would you use the following? (please tick)

	Very likely	Fairly likely	Not sure	Unlikely	Very unlikely
Search the library catalogue/OPAC					
Check your library account					
Renew library books					
Reserve library books					
Find out about the e-books/ e-journals/ e-newspaper					
Find out about the library hours/ contact details					

10. If the following mobile based library services were introduced, how likely would you use them? (please tick)

	Very likely	Fairly likely	Not sure	Unlikely	Very unlikely
Ask a librarian for help or advice via text message					
Ask a librarian for help or advice via instant messaging e.g. WhatsApp etc.					
Receive text messages/mail about overdue books					
Receive text message/e-mail when reserved books become available					
Receive any notification about the library news/updates/event					
Pay library fines via mobile phone					

11. Do you take picture/photocopy of library books/documents by your smart phone instead of issue the particular books/documents? (please tick)

a. Yes ☐   b. No ☐

12. Do you know what a QR code is? (please tick)

a. Yes ☐ b. No ☐

13. If yes, have you ever scanned a QR code with your mobile device in library? (please tick)

a. Yes ☐ b. No ☐

14. Do you think that if library starts using mobile technology it will increase the following? (please tick)

a. More access to the library ☐

b. Usability of information sources ☐

c. Ease to use the library ☐

d. Number of request/ services ☐

e. Quality and efficiency of library ☐

15. If your library starts using mobile technology would you like to receive training/assistance to use the mobile application? (please tick)

a. Yes ☐   b. No ☐

16. Do you have any problem if your library connects with you through your mobile phone? (please tick)

Yes ☐   b. No ☐

17. Any comments/ suggestions

☐