

# Educational Use of Smart Phone: A Study with Special Reference to the Research Scholars in Central Library, Visva-Bharati, Santiniketan

Sri Jishnu Mondal<sup>1</sup>, Sukumar Mondal<sup>2</sup>, Tridib Tripathi<sup>3</sup> and Piyali Kundu<sup>4</sup>

<sup>1</sup>Professional Assistant, Central Library, <sup>4</sup>Senior Research Fellow, Department of Statistics

<sup>1&4</sup>Visva-Bharati University, West Bengal, India

<sup>2</sup>Assistant Professor & Head, <sup>3</sup>Professor (Retd.),

<sup>2&3</sup>Department of Library and Information Science, The University of Burdwan, West Bengal, India

E-Mail: jishnu.mandal@gmail.com

**Abstract** - Smartphones are becoming increasingly popular in students' lives for variety of purposes. Advancement in mobile technologies has demonstrated that they provide great potentials for educational and academic use. In this paper an attempt has been made to investigate into the use of smart phones for academic purposes by the Research Scholars (RS) at Visva-Bharati Central Library. The present study also investigates the perception of Research Scholars on proposed Smartphone- based resources and services if they are offered by their university. The findings suggest that smartphone can be very useful as an educational tool. The findings also reveal that the respondents' perception on the application of smartphone in the context of Library and Information services is found to be very positive.

**Keywords:** Smartphone, Mobile Learning, ICTs, MOPAC, QR Code, Library and Information Services

## I. INTRODUCTION

Smartphones are one of the most popular devices used by the people globally these days. They have become one of the main tools to get instant access to the required information. According to Oxford online dictionary, a "Smartphone is "a mobile phone that performs many of the functions of a computer, typically having a touchscreen interface, Internet access, and an operating system capable of running downloaded apps" (<https://en.oxforddictionaries.com/definition/smartphone> 2019). The majority of these devices run on any of these popular mobile operating systems e.g.: Android, iOS, and Windows, etc. (<https://www.techopedia.com/definition/2977/smartphone> 2019). The first smartphone was IBM's Simon, which was presented as a concept device rather than a consumer device at the 1992 COMDEX computer trade show (<https://searchmobilecomputing.techtarget.com/definition/smartphone> 2019). The smartphones are being significantly used in our society and recently managed to penetrate into the educational sector in an effort to improve information delivery services. The recent advances in mobile technology have changed the very concept of the learning environment. In the recent years in education sector, more specifically, in higher education, popularity of smartphones has increased gradually and their impact on higher education has been incremental. A student with his or her head buried in a smartphone screen is ubiquitous in academic premises. Walking down the street, in elevators, even during classes,

smartphone and other similar devices are the constant companion of the learners of this generation. With the increasing attention now being given to the role of smartphones in the educational use, many academic institutions have already introduced mobile based services. In most institutions where such changes have not yet been made, active planning for them is in progress. But to what extent the users are using such devices for academic purposes has to be examined. Thus, the basic aim of the study is to understand the nature of smartphone use among research scholars at Visva-Bharati Central Library (VBCL) and to investigate their perceptions on the smartphone applications in the context of library resources and services.

## II. AIM AND OBJECTIVES OF THE STUDY

Every social investigation moves with certain aims and objectives in mind. For the scientific progress, the present study, therefore, has the following objectives

1. To determine the demographic characteristics of smartphone users and non-users at VBCL.
2. To explore whether the university research scholars use their smart phones for academic purposes.
3. To ascertain the positive and negative aspects of using Smartphone for academic purposes.
4. To know the perception of the respondents pertaining to the potential application of smartphone in the contact of various library services.
5. To identify constraints of using smartphone encountered by the research scholars at VBCL.

## III. SIGNIFICANCE OF THE STUDY

In today's rapid changing world, information needs of learners and knowledge seekers are met through a plethora of mediums. With the emergence of mobile technology, smartphones have become the most common devices accessed and used by people around the world to get immediate access to information. Smartphones are relatively new in the technology world, and recently managed to penetrate the educational sector and in an effort to improve learning and information delivery services. The emergence of smartphone technologies has also demonstrated that they pose great potentials for library use. The application of

smartphone in a library plays a prominent role in facilitating access to required information to the users in an easy and expeditious manner. For such reasons many academic libraries have already introduced mobile optimized resources and services. In most libraries where such changes have not yet been made, active planning for them is in progress. Hence, the problem of the present investigation “Educational use of smartphone: A Study with special reference to the Research Scholars in Central Library, Visva-Bharati University, Santiniketan.” is topic of paramount significance in order to keep pace with the time and emerging IT revolution.

#### IV. SCOPE AND LIMITATIONS OF THE STUDY

Social investigations of every magnitude have its own limitations set forth by the investigator concerned. Without determining the scope and limitations within which a researcher has to work, no investigation can effectively be pursued and progressed. Thus, the key limitations of the present study are as under

The present study focuses only on Research scholars of Visva-Bharati. It does not cover any other levels or any other disciplines (i.e. limitation by the category of user being investigated). Any findings resulting from this study are limited in scope of the studied population. Since the study does not contain a significantly large enough sample to draw meaningful and widespread conclusions further research on a larger sample is recommended.

#### V. METHODOLOGY

For the scientific progress of this study an online survey was employed. An online questionnaire with both closed and open-ended questions was used for data collection. The questionnaire was designed using Survey Monkey ([www.surveymonkey.com](http://www.surveymonkey.com)) an online survey tool. The questionnaire was administered solely in online form so that respondents were primarily the sort of people who are familiar with smartphones and other portable devices. Through a link from the Survey Monkey, the questionnaire was e-mailed to the respondents and responses were automatically collected and the collected data were analyzed using tables, frequencies and percentiles, etc. for easy interpretation.

##### A. Size of the Sample

The study population surveyed in the present investigation covers only research scholars enrolled at the Central Library Visva-Bharati University during 2016-2018 academic calendar. In total, VBCL has 554 research scholars enrolled during the year 2016-2018. An online questionnaire was e-mailed to almost all research scholars. Out of the total 554 questionnaires, 445 were returned. Therefore, the resulting sample was 445 research scholars representing 80.32% of the total number of research scholars in the institution.

##### B. Educational Use of Smartphone

It is our experience that every media can effectively be put to educational use. Radio, television, computers, internet are some traditional as well as new media that have created innovative educational programmes for the masses. Among those that were rapidly implemented are mobile devices. With the recent advancement in mobile technology the use of smartphone is getting very common. The smartphone is being significantly used in our society and in recent times is managed to make way into the educational sector. Without any doubt, the smartphone is one of the most portable devices built with amazing features. These devices allow users not only to make and receive phone calls or text and voice messages, but also to run a wide variety of applications, popularly known as apps. Its portability paired with some of its capabilities make it almost ideal to use it as a great tool in higher education.

For these reasons, many educational institutes are attempting to provide smartphone-based educational content. Smartphone can be very useful for ‘just in time’ learning as it can take place in any location, at any time, including traditional learning environments such as the classroom, workplace, home, in community locations or in transit. A smartphone provides students with immediate and convenient access to many of the similar knowledge-enhancing capabilities, such as, file sharing, online information retrieval, and interacting with teachers and classmates, etc. (Hossain and Ahmed 2016). In this regard UNESCO (2012) had rightly stated that “the popularity of mobile phones across the world indicates a potential to support education through teaching and learning that will bring about education system transformation”.

The effective use of smartphone in education has created vast opportunities and removed educational boundaries. As a result, both teachers and students can collaborate in real time. Recent advances in mobile technologies have yielded positive results in education sector. In India, the higher education sector is currently undergoing rapid transformation process. Electronic content and smart classrooms are becoming lifeline of modern day education.

In this direction Govt. of India has made huge investment and launched National Mission on Education through Information and Communication Technology (NMEICT) in the year 2009 in order to digitize the educational content and delivery using state-of-the-art information and communication technology. As a result, the use of information and communication technology in all aspects of higher education has received a major thrust in India. In this direction several Government and private organizations have started offering mobile app-based e-learning courses, e-content, online lectures, etc. These are, Swayam App, Swayam Prabha Android app, NPTEL, IGNOU e-content app, BYJU’s app etc.

## VI. ADVANTAGES AND LIMITATIONS

Every new system has some advantages and disadvantages, some benefits and limitations. We may consider the following points to defend why one should opt for Smartphone for education.

1. *Easy Access:* Smartphone allow research scholars to learn at “anywhere and at any time” thus providing research scholars with highly individualized and personalized learning experience as they can learn in a way, they are comfortable (Chiu, Dukic and Lo 2015).
2. *Facilitates Collaborative Social Learning And Enhanced Interaction:* Smartphone encourages collaborative learning, allowing learners at different locations to get in touch with their peers or others teams to discuss and learn.
3. *Sustainability:* Using Smartphone for educational purposes is more sustainable compared to the traditional learning methods which include papers, pencils, and pens. Getting reference notes is very simple in mobile devices as it requires just a download (<http://www.edsys.in/12-benefits-of-using-apps-in-education/> 2017).
4. *Audio and Video Can Bring Learning to Life:* Thoughts of traditional methods of learning accompany a generic feeling of boredom. On the other hand, smartphone in the guise of different learning apps is helping those looking for some newness in the universe of learning. (<http://www.edsys.in/12-benefits-of-using-apps-in-education/> 2017).

While Smartphone brings a lot to the learning table, it certainly has some limitations that one should consider before using it as a learning tool. Here are a few:

1. *Cost:* Smart phones are relatively expensive to buy compared to other phones.
2. *Inconvenience Screen Size:* Smartphone normally has a small screen size where the student is forced to strain their eyes as they access the online educational resources.
3. *Limited Storage:* Storage capacity that is available in smartphones may not be enough to store numerous offline content and other downloaded resources.
4. *Unexpected Distractions:* These distractions may be in the form of a simple SMS, notification or call as someone accesses online content.
5. *Short Battery Life:* Most smart phones discharge quickly especially when there are a number of active apps within the device. This could be a major problem for learning across lengthy periods of time.
6. *Limited Connectivity:* It can only work efficiently where there is accessible internet connection. Limited bandwidth and poor network signals may make it difficult to access online content.
7. *Smartphone can be of Health Hazards:* Constant exposure to the radiation emitted by mobile phones may be harmful for the learners.

### A. Educational Use of Smartphone: Possibilities in Library and Information Services

Libraries and library professionals have for ages been entrusted with the dissemination of information and knowledge. They are regarded as the purveyors of knowledge. The role of the traditional librarian has evolved from the custodian of printed document to a facilitator who locates the right information. In order to meet the new demands of the users, library professionals are constantly delving into newer ways of access to knowledge. They are catching up with the latest technological innovation to keep the user hooked to the library. With the adoption of ICTs library resources and services have undergone significant changes. It has got further dimension with the emergence of smartphone technology which augments library resources and services to a greater extent. According to Murphy “The impact of mobile technology on information seeking behavior, interpersonal communication, and patron’s expectations for services is starting to affect the way the libraries are conceived of and imprinting itself upon the design and delivery of library operations. The expanding focus on mobile technology is literally changing the way libraries around the world do business”. Smartphone has now come up with ‘libraries in hand’ trend. The increasing interest in mobile technology in providing library resources and services is apparent in the number of research studies recently conducted and it appears that the ubiquitous presence of mobile devices has made it virtually impossible for libraries to continue ignoring them. With the increasing attention now being given to the role of smartphones in the educational use, many libraries have already introduced mobile optimized resources and services. In most libraries where such changes have not yet been made, active planning for them is in progress. There are immense possibilities in library and information services with the aid of smartphone. Listed below some of the smartphone based services which have become very popular and some demand proper utilization.

1. *Text Alert Services:* Many libraries have introduced SMS, e-mail, Whatsapp based alert services for a variety of purposes including due date reminder, information on availability of library materials, library event information, etc.
2. *SMS Based Reference Services:* Some libraries are offering “text-a-librarian”, “WhatsApp a librarian” services for very simple reference query that can be answered with a brief response.
3. *Mobile Online Public Access Catalogue Interface (MOPAC):* Libraries in their quest to offer tailor-made services are developing and providing access to mobile versions of their OPAC.
4. *Access to E-Resources:* Many database publishers e.g. EBSCO, ACM, Springer are developing mobile apps in order to provide access to their e-resources through smartphone and other similar devices.
5. *QR Code-Based Services:* QR codes are mainly used by the libraries for the purpose of promoting their services

and providing instant access to their resources with the use of Smartphone (Ashford 2010).

6. *Mobile Instructions and Mobile Tours of the Library:* Library orientation and information literacy programme can be provided effectively through use of smartphone. For example, YouTube can be a best tool for library video tour.

## VII. ANALYSIS AND INTERPRETATION OF DATA

### A. Demographic Information of Respondents

The population of this study is Research Scholars enrolled during 2016-2018 at Visva-Bharati Central Library (VBCL). In total, VBCL has 554 Research Scholars. Questionnaires were distributed to almost all students. Of the total number (554), 445 were returned. Therefore, the resulting sample was 445 research scholars(RS) representing 80.32% of the total number of RS of whom 195 were female, representing 43.82% of the total RS at VBCL, and 250 were male, representing 56.18% of the total RS at VBCL.

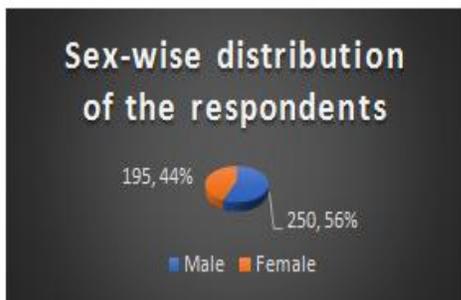


Fig. 1 Sex-wise distribution of the respondents

### B. Ownership of Smartphone

Mobile technology has spread rapidly around the globe. In higher education sector, the use of smartphone has also increased rapidly over last 10-year period. In order to

ascertain the total no of smartphone users and non-users among the research scholars at VBCL, a question was asked to indicate the status.

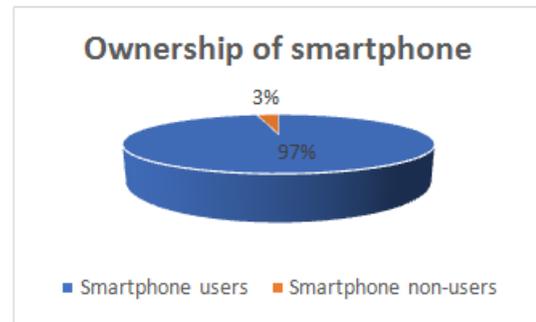


Fig. 2 Ownership of Smartphone

Unsurprisingly, the finding Fig. 2 shows that of the 445 sampled research scholars, there were 431 (96.85%) research scholars who were using smartphone and on the other hand only 14 (3.14%) research scholars were found to be smartphone non-users. The result suggests the growing popularity of smartphone in the academy.

### C. Respondent's Opinion Regarding the Purpose of Using Smartphone

Students of present generation of all categories are considered heavy users of smartphone around the world. They use it as a medium to connect with other people, sharing files, entertainment, etc. Since, the students often serve as opinion leaders in technology products, it is, therefore, pertinent to investigate into the purpose of using smartphone. Within the survey, we decided to emphasize access over ownership in order to better understand researchers' habits and anticipate where smartphone use would most likely take place. The resultant responses are reflected in the following Table I.

TABLE I PURPOSE OF USING SMARTPHONE

Purpose of using Smartphone	Very frequently	Frequently	Occasionally	Rarely	Never	Max
Communication	445 (100%)	0	0	0	0	445
Finding General Information(internet, weather, map, etc)	417(93.7%)	28(6.3%)	0	0	0	417
Academic	61(13.71%)	297(66.74%)	87(19.55%)	0	0	297
Recreational use	0	37(8.31%)	374(84%)	34(7.64%)	0	374
Seeking jobs	27(6.1%)	361(81.12%)	57(12.81%)	0	0	361
Online shopping	0	0	289(64.94%)	123 (27.64%)	33 (7.41%)	289

The above Table I clearly reveals that 100% of the respondents used Smartphone "Very frequently" for communication. Followed by 93.7 % respondents used Smartphone "Very frequently" "for "finding general information", whereas 81.12% and 66.74% respondents use smartphone "frequently" for searching jobs and accessing

educational content respectively. Whereas 84% respondents stated that they used smartphone "Occasionally" for recreational use. Interestingly, the table also reveals that 64.94% respondents stated that they used smartphone occasionally for 'online shopping'. Based on these results, it can be concluded that the smartphone affects the

researchers' life in multiple ways ranging from communication to buying products online.

*D. Respondents' Opinion Regarding Academic Usefulness of Smartphones*

In order to ascertain usefulness of smartphone in education, respondents were asked to give their opinion regarding the academic usefulness of smartphone.

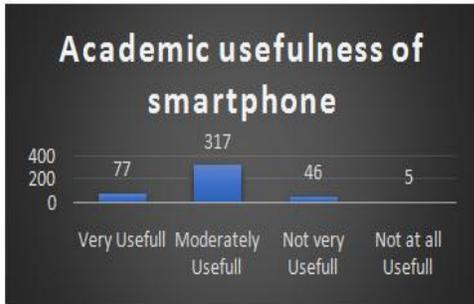


Fig. 3 Respondents' opinion regarding the academic usefulness of smartphones

It is evident from the Fig.3 that out of 445 research scholars' surveyed 317 (71.23%) respondents opined that smartphones are "moderately useful" for academic purposes followed by 77(17.30%) respondents who thought

smartphones are "very useful" for academic purposes, whereas 46 (10.33%) respondents stated that smartphones are "not very useful for their academic endeavour. The above chart also reveals that a very insignificant number of respondents i.e. 5(1.12%) respondents feel that smartphones are "not at all useful" for academic purposes. Hence, it can be stated that, irrespective of whether the research scholars use their smartphone for academic purposes or not, there was a favourable agreement with regard to statements about the usefulness of smart phones for academic work. Using chi-square test, the study reveals the Chi<sup>2</sup> value is 530.811 with 3 degrees of freedom (df). The p-value is < .00001. The result is significant at p < .05. By conventional criteria, this difference is considered to be extremely statistically significant. Hence, the connotation is that, the academic usefulness of smartphone tending towards better and it will increase user's satisfaction in near future.

*E. Respondents' Opinion Regarding Positive and Negative Aspects of the Use of Smartphone for Educational Purposes*

Every new system has some advantages and disadvantages, some benefits and limitations. Hence, in order to ascertain the perceived advantages and disadvantages of e-resources respondents were asked "What have been positive and negative outcomes from the use of e-resources?"

TABLE II POSITIVE STATEMENTS ABOUT THE USE OF SMARTPHONE BY STUDENTS

Positive statement about the use of smartphone	Strongly Agree (N, %)	Agree (N, %)	Disagree (N, %)	Strongly Disagree (N, %)	Total
Faster and easier access to information	429 (96.4%)	16 (3.6%)	0	0	100
Are convenient	67 (15%)	378 (85%)	0	0	100
Enhanced Interaction	396 (89%)	49(11%)	0	0	100
Allow for easy dissemination of information	364 (81.8%)	81 (18.2%)	0	0	100

The above table clearly reveals that, the positive statement of smartphone is dealt with four key variables. As shown in Table II all respondents indicated very positive attitudes towards the use of smartphone. The result indicates that 100% of them at least "agreed" with the statement that smartphones allow faster and easier access to information, convenient, allow enhanced interaction and

easy dissemination of information. On the flip side of it, every technology has its own limitations or disadvantages and the smartphone are no different. Hence, the respondents were asked to state their level of agreement or disagreement about some of the negative aspects towards the use of smartphone.

TABLE III NEGATIVE STATEMENTS ABOUT THE USE OF SMARTPHONE

Negative statement about the use of smartphone	Strongly Agree (N, %)	Agree (N, %)	No strong Opinion (N, %)	Disagree (N, %)	Strongly Disagree (N, %)	Total
Smartphone cause distraction	431 (96.85%)	14 (3.15%)	0	0	0	100
Smartphone Are addictive	382 (85.85%)	58 (13.03%)	5 (1.12%)	0	0	100
Smartphone can be health hazards	105 (23.6%)	321 (72.13%)	19 (4.27%)	0	0	100

As shown in Table III, it is observed that 100% of the respondents at least agree with the statement that smartphone "cause distraction" followed by 98.87% per cent respondents at least agree that the smartphones are

"addictive", whereas 95.73% respondents at least agree that the smartphone can be "health hazards".

*F. Respondent’s Opinion Regarding Significant Barriers That Affect Both Use and Non-Use of Smartphone*

Though the emergence of smartphone gives researchers a wealth of creative options to enhance their research experience, some barriers are sure to crop up during the course of accessing these devices. Hence, in order to explore the major barriers that may affect both for use and non-use of smartphone for academic purposes, respondents were asked to state the barriers they encounter while accessing smartphone for educational purposes. Significance level of the barriers was measured in a Likert scale of 1 (Not significant) to 4 (Very Significant). Table no 4 provides descriptive statistics of the findings listed in descending order according to the mean score. According to the result, the mean score that is higher than 3 would indicate that the respective barriers affect the use of smartphone as a learning tool.

TABLE IV RESPONDENT’S OPINION REGARDING SIGNIFICANT BARRIERS THAT AFFECT BOTH USE AND NON-USE SMARTPHONE

Mobile library services	N	Min.	Max.	Mean
Small screen size	445	1	4	3.51236
Limited battery life	445	1	4	3.32809
Limited storage capacity	445	1	4	3.29213
Limited network connectivity	445	1	4	3.05843
Cost	445	1	4	1.76404

Table IV clearly demonstrates some significant barriers as highlighted by the respondents that need to be considered while accessing educational content using smartphone. As

the Table IV shows that the major barrier to using smartphones for learning for research scholars is that the smartphone’s screen size (mean score 3.51236) is too small for reading educational content. Another barrier for not using smartphones for educational purposes is that smartphones have limited battery life (mean score 3.32809) as this could be a major problem for learning across lengthy periods of time. Limited storage capacity (mean score 3.29213) was also a barrier that respondents rated as significant. Another barrier highlighted is Limited network connectivity (mean score 3.05843) indicating high mean score, which is above 3. Some of the respondents also indicated “Cost” (mean score 1.76404) as another barrier for not using smartphones for study purposes, though it is not tenable.

*G. Perceived Smartphone Application In Library Services*

Visva-Bharati Central Library does not currently have any resources and services specifically designed for smartphone. Consequently, it was important to find out what resources and services they would likely to use with smartphone, if available. Hence, in order to find out what resources and services users would like to avail with smartphone access, questions were asked pertaining to their perception of usefulness of the proposed services, if they were to be offered by their parent university. Preferences to the types of library resources and services were measured in a Likert scale of 1 (Not at all Useful) to 5 (very useful). Table V provides descriptive statistics of the findings listed in descending order according to the mean score. According to the result, the mean score that is higher than 3 would indicate that the respondents were in favor of the services.

TABLE V DISTRIBUTION RESPONDENTS ACCORDING TO USEFULNESS OF PROPOSED SMARTPHONE-BASED LIBRARY SERVICES

Mobile library services	N	Min.	Max.	Mean
Search library catalogue	445	1	5	4.907865
Accessing library e-resources and services	445	1	5	4.892135
Receiving reminders, alerts	445	1	5	4.669663
Accessing Mobile library websites.	445	1	5	4.635955
Renewal of library items	445	1	5	4.505618
Reference enquiry services	445	1	5	4.280899
Fee payment	445	1	5	3.026966

Table V clearly demonstrates that there were some services respondents believed to be very useful to them. The result shows that most of the respondents were in favour of ‘Searching library catalogue’ (mean score 4.907865). Followed by the ability to ‘access the library e-resources’ (mean score 4.892135) was also a service that respondents rated as very useful. This suggests that there is a strong desire to access library resources on the move. Other services proposed e.g. receiving reminders, alerts, accessing mobile library websites, renewal of library items, reference enquiry services also indicated high mean score, which are above 3. It may be summarized that the respondents’ perceptions on the application of smartphone in the context

of library and information services were found to be very positive as majority of the respondents indicated their willingness to become the users of such services if offered.

*H. Respondents’ Opinion Regarding the Implementation of Smartphone Based Resources and Services*

In order to ascertain respondents’ perception regarding the importance of implementing Smartphone based resources and services in the library, a question was asked to elicit information from the respondents. The resultant responses are consolidated and reflected in the following chart for necessary statistical inference.

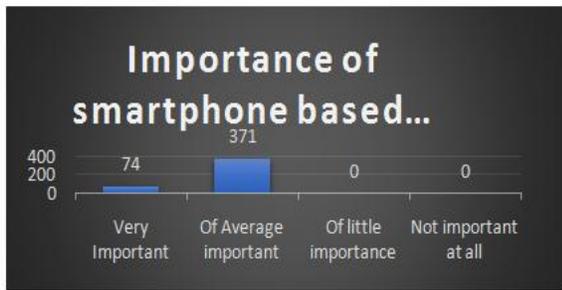


Fig. 4 Importance of smartphone based library services

The above chart clearly reveals that, the perceptions of the respondents on the implementation of smartphone based library services are dealt with two key variables- 'Very Important' and 'Of average importance'. The data reveals that, there is a consistency and uniformity in the perceptions of the respondents in regard to the implementation of smartphone based library services since the opinions expressed under both the variables are identical, as 100% of the respondents included in the study feel that implementation of smartphone based library services is both- 'Very Important' and 'Of average importance' in modern day academic environment. The result suggests that smartphone based library services would be incredibly useful as it facilitates both access to information and communication.

### VIII. FINDINGS OF THE STUDY

The following major findings are drawn from the analysis and interpretation of data:

1. The results of the current study demonstrate that 96.85% of research scholars as surveyed own Smartphone. The result suggests the growing popularity of smartphone in the academy.
2. Regarding the purpose of using smartphone it was found that 100% of the respondents used Smartphone "Very frequently" for communication, followed by 93.7 % respondents used internet "Very frequently" for "finding general information", whereas 81.12% and 66.74% respondents used smartphone "frequently" for searching jobs and accessing educational content respectively. It is also found that 84% respondents stated that they used smartphone "Occasionally" for recreational use. Interestingly, 64.94% of the respondents stated that they use smartphone occasionally for 'online shopping'. Based on these findings, it can be concluded that the smartphone affects the researchers' life in multiple ways ranging from communication to buying products online.
3. The findings also indicate that 66.74% respondents used smartphone "frequently" for accessing educational content and perceived smartphone as a learning tool that allow instant access to desired information and significantly enhance 'Blended learning'. Thus, the respondents had a positive perception towards academic use of smartphones.

4. Regarding the academic importance of smartphone, it was found that 317 (71.23%) respondents opined smartphones are "moderately useful" for academic purposes followed by 77 (17.30%) respondent thought smartphones are "very useful", whereas 46 (10.33%) respondents stated that smartphones are "not very useful for their academic endeavour. A very insignificant number of respondents i.e. only 5 (1.12%) respondents feel that smartphones are "not at all useful" for academic purposes
5. Regarding the positive aspects of smartphone towards academic usage the researchers stated that smartphones allow easy dissemination of information, increase the speed of finding information, help communication and convenient. On the flip side, a large number of respondents also agreed with the statement that smartphone, are addictive, causes distraction, and causes health hazards.
6. Major barriers in using smartphone for academic purposes as mentioned by the respondents are the "small screen size" followed by the "limited memory size" and "Limited battery life". The other reason for not using smartphones for study purposes is that the "Cost" to own a smartphone, though it is not tenable.
7. The finding also suggests that the respondents' perceptions on the application of smartphone in the context of library and information services were found to be very positive. The result shows 'Searching library catalogue' (mean score 4.907865) and 'access the library e-resources' (mean score 4.892135) were most preferred. It is, therefore, apparent that a strong desire to access library services is on the move.
8. Regarding the implementation of smartphone based resources and services in the library the findings revealed that 100% of the respondents included in the study feel that implementation of smartphone based library services is both- 'Very Important' and 'Of average importance' in modern day academic environment. The result suggests that the smartphone based library services would be incredibly useful as it facilitates both access to information and communication.

### IX. CONCLUSION

Smartphone has emerged as an important and indispensable device as it is used to access information on a daily basis for multiple purposes. The potentiality of use of smartphone for academic purposes is growing steadily. The present study was conducted at Visva-Bharati Central Library to study the academic use of smartphones by the research scholars. The study reveals that the ownership of this device is very popular among the research scholars since they had a positive perception towards academic use of smartphones. The study also demonstrates that the respondents expressed considerable interest in accessing library resources using smartphones. In the light of ongoing trends towards more widespread use of smartphones, it makes sense for academic libraries to "work towards shaping their vision of a

preferred future” for themselves and provide access to some of their resources and services in ways that work well with smartphones and other similar devices. The present study highlights some of the potential areas for the implementation of these technologies in the University Library. Some advantages and disadvantages of using smartphone for educational purposes have also been highlighted in the present study which is to be analyzed before implementation in libraries. The present study, therefore, could serve not only as basis for further research and implementation for such services in other university libraries in the country but also be of value for similar institutions with comparable situations in India and other developing countries to provide enhanced information needs and services to its clientele.

### REFERENCES

- [1] Ashford, R. (2010). QR codes and academic libraries: Reaching mobile users. *College and Research Libraries News*, 71(10), 526-530. Retrieved April 4, 2019, from <https://crln.acrl.org/index.php/crlnews/article/view/8454/8696>.
- [2] Chiu, D., Dukic, D., & Lo, P. (2015). Educational Use of Mobile Technologies Amongst Library & Information Science (LIS) Students – a Comparative Study Between the University of Hong Kong and the University of Tsukuba. *Journal of Academic Librarianship*, 41(5), pp. 567-577.
- [3] Chow, A. S., Bridges, M., & Commander, P. (2014). The website design and usability of US Academic and Public Libraries: findings from a nationwide study. *Reference and User services Association (RUSA)*, 53(3). Retrieved January 25, 2018, from <https://journals.ala.org/index.php/rusq/article/view/3244/3427>.
- [4] Frand, J. (2000). The information age mindset: Changes in students and implications for higher education. *Educause Review*, 35(5).
- [5] Hossain, M. E., & Ahmed, S. Z. (2016). Academic use of smart phones by university students: a developing country. *The Electronic Library*, 34(4), 651-665. doi:10.1108/EL-07-2015-0112
- [6] Retrieved from <http://www.csplacement.com>. (2018). On February 24, 2018.
- [7] Retrieved from <http://www.edsys.in/12-benefits-of-using-apps-in-education/>. (2017). On February 21, 2019.
- [8] Retrieved from <http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/open-educational-resources/>(2018). On January 26, 2018.
- [9] Retrieved from <https://elearningindustry.com/mobile-apps-in-education-5-benefits>. (2018). On May 3, 2018..
- [10] Retrieved from <https://en.oxforddictionaries.com/definition/smartphone>. (2019). On February 21, 2019.
- [11] Retrieved from <https://en.wikipedia.org/wiki/Smartphone>. (2017, November 11). Retrieved from <https://searchmobilecomputing.techtarget.com/definition/smartphone>. (2019). On February 21, 2019
- [12] Retrieved from <https://smartphonesinclassrooms.weebly.com/advantages-and-disadvantages.html>. (2017). On February 21, 2019.
- [13] Retrieved from <https://www.ericsson.com/en/press-releases/2015/6/ericsson-mobility-report-70-percent-of-worlds-population-using-smartphones-by-2020>. (2019). Retrieved February 18, 2019.
- [14] Retrieved from <https://www.iso.org/obp/ui/#iso:std:iso:9241:-11:ed-1:v1:en>. (2018, February 25). Retrieved from <https://www.iso.org/obp/ui/#iso:std:iso:9241:-11:ed-1:v1:en>.
- [15] Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4114424/>. (2018). On May 3, 2018.
- [16] Retrieved from <https://www.techopedia.com/definition/2977/smartphone>. (2019). Retrieved February 21, 2019.
- [17] Ivwighrehweta, O., & Onoriode, O. K. (2012). Awareness and Use of Open Access Journals by LIS Students at the University of Ibadan, Nigeria. *Library Philosophy and Practice*. Retrieved March 25, 2018, from <https://digitalcommons.unl.edu/libphilprac/719/>.
- [18] Liu, S. (2008). Engaging Users: The Future of Academic Library Web Sites. *College, Research and Libraries*, 69(1). Retrieved March 22, 2017, from <https://crl.acrl.org/index.php/crl/article/view/15909>.
- [19] Ocran, T. K. (2017). Perception of students on mobile technology based library services. *Library Philosophy and Practice (e-journal)*. Retrieved March 7, 2019, from <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=5065&context=libphilprac>.
- [20] Singh, S. (2018). Users and information use in Academic libraries. Retrieved from <http://epgp.inflibnet.ac.in>.
- [21] Thomas, C., & McDonald, R. (2005). Millennial net value(s): disconnects between libraries and the information age mindset. *Free Culture and the Digital Library Symposium Proceedings: MetaScholar Initiative at Emory University*, 93-105. Atlanta, Georgia. doi: [http://digitool.fcla.edu/dtl\\_publish/7/110240.html](http://digitool.fcla.edu/dtl_publish/7/110240.html).