

# User's Perception and Intention Towards Accessing Library Through Smartphones: An Analytical Study Based on Library Users of National Institute of Technology Durgapur

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## Abstract

*Smartphones have become very common and popular devices to everyone nowadays with the prevalence of wireless data communication technology. It has a great impact in our daily life from making a simple call to accessing Internet. Rapid growth of smartphone adoption in higher educational institutes led to carry out the study predominantly. Two hundred ten (210) library users of National Institute of Technology (NIT) Durgapur were sampled under the study. The study is mainly carried through a proper questionnaire to identify their actual usage of smartphones for general purposes, for accessing library and also their intentions to use library app. The study specifically highlights that 98 percent respondents use smartphones for academic, entertainment and social activities. 69.27 percent respondents' access library through their smartphones and only 60.49 percent responded that they are satisfied after using library. The study also highlights that 69.76 percent respondents prefer to access library through library app.*

**Keywords:** Analytical study, Library Apps, Library Users, NIT Durgapur, Smartphone Usage

## 1. Introduction

The ubiquity of mobile learning is rapidly increasing years after years. Collateral advancement of World Wide Web and Smartphones (mobile phones, tablets, palmtops, PDAs etc.) has stimulated the users' information search behaviour over the past few years. Exponential advancement in the telecommunication sectors is the main threshold that escalates the expansion of those handheld devices. These devices are becoming a widely used for learning devices (Norris et al. 2011). A study shows that 70 percent of people will use smart phones and 80 percent of all mobile data traffic will come from smart phones by 2020 (Ericsson, 2015). These

increasing factors also have influenced mobile cellular subscriptions worldwide rising by 7377 (in millions) and 99.7% (per 100 inhabitants) respectively at the end of 2016 (ITU World Telecommunication statistics).

With the rise in smartphone use, people are taking advantage of being connected to data wherever they are. Mobile application (App) is the main access to mobile network. For example, about 2.8 million and 2.2 million apps are there in the two largest stores Google Play Store and Apple App store respectively (Statista, 2017). Moreover, the number of app users also growing fast, which may reach 4.4 billion by the end of 2017 (Portio Research 2013). Exponential growth in the mobile connectivity makes sweeping changes in information search behaviour among users (Chang, 2013). Demands for mobile library



services are dramatically increasing due to large user base of mobile services. Academic libraries have the opportunity to extend new types of services to users of mobile devices and to develop, license, or otherwise make available scholarly contents configured for mobile devices (Lippincott 2008, 2010). Libraries also explore mobile devices as a way to connect with users, creating a library application (“app”) or mobile website that allows users to access library hours, view their library account or even search databases.(Zhang et.al.,)

Asia has particularly been early adopters of smartphones and mobile technologies and it is not surprise that many case studies in the early days of this emergent technology have been based from that region (Lo et al. 2016). India has become the second-biggest smartphone market in terms of active unique smartphone users, crossing 220 million users and is expected to become 810 million by 2020 (The Hindu). Indians downloaded 6.2 billion apps through Google Play, up from 3.6 billion in 2015 (Quartz India). The smartphones also have become an integral part of Indian education system. Smartphone-hungry students in India are helping push demand for the devices in the country to new heights (eMarketer, 2016).

### 1.1 Background of the Study

The prospect of mobile learning is getting conceptualized in Indian higher education environment very swiftly. The growing ubiquity of mobile phones, the widespread availability and adoption of mobile broadband technology and market penetration of low-cost smartphones also hold key promises for the use of mobile technologies for education delivery in India. (Raman, 2015). With the prevalence of smartphones and with compatible

applications (apps) students are also accustomed with many apps based services for different purposes like study and learning, social life and entertainment etc. Many Indian academic libraries are in a way to adopt apps based library services for its users’. These potentialities led to carry out a study of NIT Library users regarding their access, usage library through smartphones and after all their intentions to use mobile apps based library services.

The present study is emphasized on National Institute of Technology Durgapur (<http://www.nitdgp.ac.in/>) which is located at Durgapur, West Bengal, India. The Institute has 6500 plus (six thousand five hundred) UG, PG and PhD students those accessing library regularly through different devices. The institute has not taken any initiative to start app based library services. Though mobile apps based library services is not a new approach for NIT Libraries.

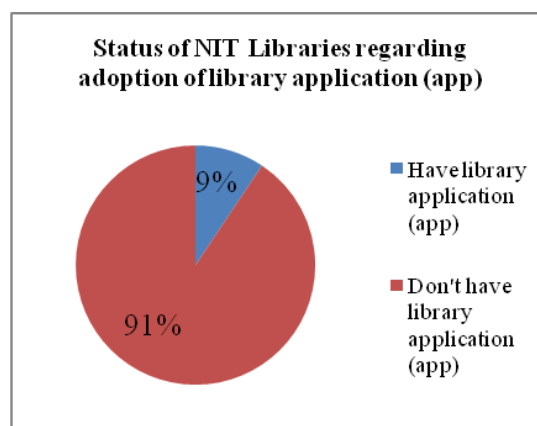
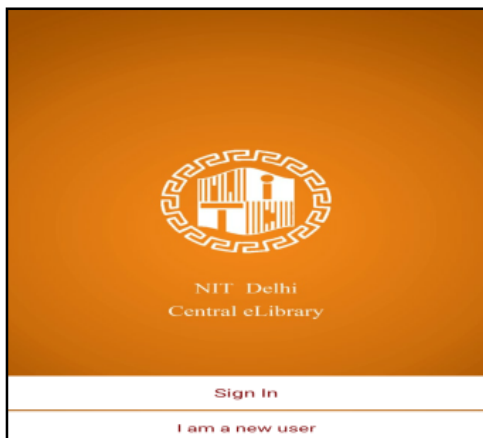


Figure 1: Status of NIT Libraries on library app adoption



**Figure 2: Library app of NIT Rourkela**  
(<http://library.nitrkl.ac.in/>)



**Figure 3: Library App of NIT Delhi**  
(<http://nitdelhi.ac.in/centralLibrary.php>)



**Figure 4: Library app of NIT Hamirpur**  
([library.nith.ac.in/library/about\\_us.php](http://library.nith.ac.in/library/about_us.php))

Three NIT Libraries e.g., NIT Rourkela, NIT Delhi, and NIT Hamirpur out of thirty two NIT Libraries in India (Wikipedia, 2017) have started mobile apps based library services. These all apps are available in Google Play Store also.

## 2. Literature Review

Speight (2009) found that interest in mobile technology in providing library services is apparent in the number of case studies recently conducted and the growing number of mobile friendly websites and native applications being developed for libraries.

Park and Jung (2013) studied Korean smartphone users' perception of usefulness of smartphones for learning. The majority of survey participants think that smartphones are very useful for learning anytime and anywhere. Dahlstrom et al. (2013) surveyed 112,000 College and University students from USA and 13 other countries about their use of mobile devices for academic purposes. The study identified a substantial growth in the use of smartphones for academic purposes over the period from 2011 to 2013. Paterson and Low (2011) conducted an online survey that attracted 1,716 participants to provide quantitative and qualitative data on students' use of mobile devices. The study predicted that ownership of smartphones would rise dramatically over a relatively short period of time and also demonstrated that there is a strong desire among students for mobile library services. Dukic and Chiu (2015) conducted a survey involving Library and Information Science (LIS) students from University of Hong Kong and University of Tsukuba (Japan). The study finds that they use smartphones to access course materials, search library catalogue, discuss course assignments with peers, take notes,

etc. Ang et al. (2012) explored the potential use of mobile library services by undergraduate and graduate students from three Universities in Hong Kong and one University in Singapore. The study shows that over three quarters of respondents from both cities, Hong Kong and Singapore, would very likely or likely use mobile devices to search library catalogue, retrieve electronic resources, access course reserve, check for new books and resources, view their borrower record and book a group study room if such services are available. Kim et al. (2013) investigated the use of smartphones for learning among education and engineering University students at one Korean University. The study findings reveal that all students extensively use various smartphones apps for learning purposes. The most commonly used apps are dictionary and translation, document viewer, e-mail and text, media, notes, scheduling, social networks and web searching.

### **3. Aims of the study**

The present study is aimed at:

- (a) Identifying their general purposes for smartphone usage.
- (b) Identifying the scenario of library usage through smartphones.
- (c) Identifying their intentions to use library app.

### **4. Methodology**

The present study is carried out to explore the adoption and usage scenario of smartphones among library users of National Institute of Technology Durgapur, West Bengal, India. The study specifically emphasizes on smartphones due to its portability than other mobile devices and is almost

carried over at all times (Sun et al., 2014). Before collecting responses from library users we communicated with National Institute of Technology Durgapur Library Authority and got the due permission. A structured Questionnaire containing thirty seven questions (thirty five are basic and two are comparative questions) was duly developed. The questionnaire was divided into three phases to get actual responses on their diversified usage where (a) Phase I defines general smartphones usage scenario among library users (b) Phase II defines scenario of accessing library through smartphones (c) Phase III defines library user's intention/ awareness of using library services through mobile library application (app).

An open invitation was there for library users to participate in the study. Only two fifty (250) were invited to respond under the study. They were distributed printed questionnaire with a time slot of few hours to fill it up. Library users were instructed to put the answers on the mentioned places what actually they think and to maintain its authenticity they were said to mention their names, gender, stream, roll no., email id and also full signature at the last. They were also informed that their responses would be used only for study purposes and would represent the institute regarding smartphone usage and adoption scenario in India and global perspective. Those who could not understand any questions were convinced and explained its relevancy individually. The study takes two days to collect responses from respondents. Each questionnaire received from respondents was checked and duly sorted out. Over two fifty (250) distribution, only two ten (210) responded successfully. As the study is entirely based on smartphones usage, so those who don't use

smartphones are not taken into the study. Out of two ten (210) respondents only five (5) don't use smartphones (mentioned in Table 1). Basically quantitative technique (Paterson & Low, 2011) was applied for data interpretation.

**Table 1: Respondent's status category wise**

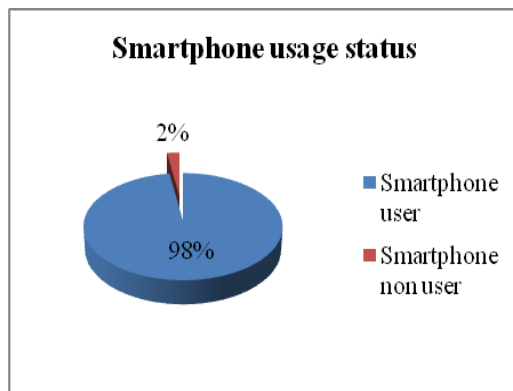
Respondents	Total no. of respondents	Smartphone user	Non Smartphone user
Male	150	146	4
Female	60	59	1
Total	210	205	5

## 5. Results & discussions

### 5.1 Adoption and usage of smartphones for general purposes (Phase I)

#### 5.1.1 Smartphone usage status

The study explores that smartphones have become a common device to all and a major percent uses smartphone among respondents. Figure 5 shows that 98 percent respondents own smartphones and only a 2 percent are not using it.



**Figure 5: Smartphones Usage Scenario**

### 5.1.2 Smartphone preferences

In the study respondents are found very brand conscious. Most of them usage some brands those are reputed in market.

Table 2 shows that Samsung is very popular smartphone brand among respondents. Major uses Samsung brand (44), then MI (32), Lenovo (24), Motorola (20), iPhone (17), Micromax (14), Asus (11) and others (incl. of Microsoft, Blackberry, Vivo, iball etc. use 43).

**Table 2: Brand Preferences**

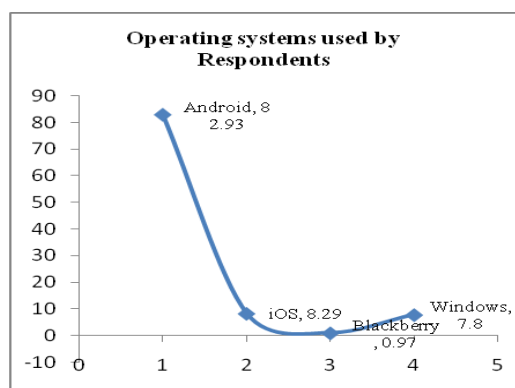
Brand used	No. of respondents	%
Samsung	44	21.46
MI	32	15.6
Lenovo	24	11.7
Motorola	20	9.75
iPhone	17	8.29
Micromax	14	6.83
Asus	11	5.37
Others (Incl. Microsoft, Blackberry, Vivo, iball etc.) (n = 205)	43	20.98

Due to having its user friendly features, android is very popular smartphone operating system around the world (Gartner, 2016). The study also finds that major percent respondents under study use android as their mobile OS. Figure 6 clearly depicts that 82.93 percent use Android, then 8.29 percent use iOS, then 7.8 percent use Windows and rest 0.98 percent use Blackberry.

### 5.1.3 Internet usage

While accessing Internet they were questioned which kind of devices they prefer for accessing Internet. Table 3 depicts that everybody is using

Internet through their mobiles and besides it they also prefer laptop (177), desktop (55) and tablet (19) respectively. They also told that all are very effective but mobile are easy to carry out anywhere anytime.



**Figure 6: Operating Systems used by Respondents**

**Table 3: Preference Devices for Accessing Internet**

Items	Mobile	Laptop	Tablet	Desktop
Respondents (n =205)	205	177	19	55
%	100	86.34	9.27	26.83

The users were found highly active on Internet. On an average they spend a lot of times in a day while accessing Internet for their study, important works, and other entertainment purposes. Table 4 clearly mentions that most of the users i.e., 95(46.34 %) users engage on Internet average 2-5 hrs. in a day. Then 5-10 hours spent by 52 (25.37 %) users, <2 hrs. by 32 (15.61 %) users and > 10 hrs. by 26 (12.68 %) users are followed by.

Although they spent lot of times on the Internet but almost all the users confessed that they use Internet mainly for their study purposes. Besides their study, they also use for social media, amusement works and others.

**Table 4: Average Hours Spent by users in a Day**

Items	< 2hrs.	2-5hrs.	5-10hrs.	> 10hrs.
Respondents (n = 205)	32	95	52	26
%	15.61	46.34	25.37	12.68

Table 5 explores that 201 respondents out of 205 said that they use it for academic purposes, then they prefer social works (147 respondents), then they prefer entertainment works (71) and others (30) purposes.

**Table 5: Major Activities by Respondents on Internet**

Items	Academic	Social	Amusement	Others
Respondents (n = 205)	201	147	71	30

### 5.1.4 Basic Needs Over Time Interval

In the comparative questions the respondents were asked what kinds of major activities they perform through smartphones over time interval.

Table 6 indicates that respondents are very active on daily performances and some extent on weekly performances but are less active on monthly and once in a month. It is observed that major respondents everyday use search engines for meeting their daily academic needs. It is the highly accessed through smartphones responded by 174 respondents. Other daily activities are also for social media (167), academic purposes (124), entertainment purpose (98), reference materials (97), tools and productivity software (64), accessing library materials (48) etc. In weekly scenario respondents also use Games, Music, Movies and TV series (72), and Tools and productivity software (57), accessing reference materials (50), accessing library materials (44) and academic study and reading purposes (39).

**Table 6: Reasons for accessing the Internet over time**

Purposes	Daily	Weekly	Monthly	< Once per month	Never
Communications with friends and family using social media	167	28	0	2	8
Using search engines	174	20	5	2	4
Games, music, movies, and TV series	98	72	8	5	22
Tools and productivity software (calendar, notes )	64	57	25	4	55
Accessing reference materials (online encyclopaedia and dictionaries)	97	50	15	3	40
Academic reading and study purpose	124	39	19	0	23
Accessing library materials	48	44	40	10	63
Online shopping	5	17	68	39	76
Online financial transaction (n = 205)	4	37	58	24	123

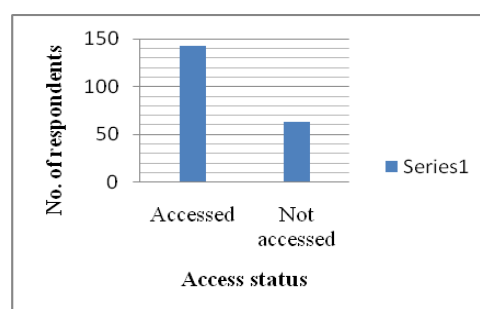
## 5.2. Scenario of accessing library through smartphones (Phase II)

### 6.2.1 Access status

Access status depicts that how many respondents access library and how many do not access. It is observed from Figure-7 that 142 (69.27%) respondents access library through smartphones and remaining 63(30.73%) respondents do not access library. Table 7 reflects the reasons which specify that users are keen to use library app.

**Table 7: Reasons for not accessing library**

Reasons	No. of Respondents
Not having library app	40
Not having mobile friendly library website	19
Not interested to access through mobiles	16
Others	16

**Figure 7: Respondent's access scenario**

### 5.2.2 Satisfactory Level

Satisfactory level determines that how many respondents are satisfied and how many are not satisfied after using library. Figure 8 clarifies 124 out of 205 respondents are satisfied and 81 respondents are not satisfied. They were asked to mention the reasons of their dissatisfaction. Only 42 out of dissatisfied respondents mentioned the reasons of their dissatisfaction. Table 8 represents the reasons.

**Table 8: Reasons for dissatisfaction**

Slow Internet speed with limited Wi-Fi	21
Not effective/accessible	10
Wi-Fi password not known to all	3
Not interested to access	3
Not compatible with mobile	2
Others	3

**Figure 8: Respondent's satisfactory level**

### 5.2.3 Access scenario

Access scenario clearly depicts the preferences and usage of respondents. Only 142 out of 205 respondents who access library have taken into the account. It is observed from Table 9 that most of the respondents mainly use library on daily (56) and weekly (55) basis and some extent on monthly (24) and rarely on fortnightly (7). They spend a reasonable minimum time of accessing it.

**Table 9: Usage frequency**

Item	Daily	Weekly	Fortnightly	Monthly
Respondents (n = 142)	56	55	7	24
%	39.44	38.73	4.93	16.9

Table 10 represents that spent <1 hr. (53), then 1-2 hrs. (45), 2-5 hrs. (37) & very less respondents spent > 5 hrs. (7).

**Table 10: Hours spent in a day**

Item	< 1hrs.	1-2 hrs	2-5 hrs	> 5 hrs
Respondents (n = 142)	53	45	37	7
%	37.32	31.69	26.05	4.93

On their usage, it is perceived that they use library for their different basic needs in different time intervals. Table 11 represents their responses based on their basic needs on different time intervals like daily, weekly, monthly, once in a month etc. Out of these daily need is very potential and some extent weekly and monthly also. Table 11 represents that on their daily needs e-resource database is the most accessed information sources. 65 out of 205 respondents use database on daily basis and then library OPAC (54) for finding books and library news (32) for latest happening on library.



**Table 11: Reasons for accessing library over time**

Purposes	Daily	Weekly	Monthly	< Once per month	Never
Search library news/events	32	48	15	8	39
Search library OPAC	54	42	21	11	14
Search library databases (e-books, e-journals, thesis & dissertations)	65	29	23	7	18
Read reviews others have left on items in library	4	14	18	11	95
Share items that you have found and think others will find useful	3	11	19	7	102
Request items through Inter library loan	3	8	8	6	117
Request/renewal of items through online	3	39	15	5	80
Access digital archive/ important books	2	13	9	8	110
Access library account (Where n = 142)	7	37	20	8	70

In their weekly needs, library news (48) is highly accessed then library OPAC (42), reserve/renewal of books online (39), accessing patron's account (37), e-resource database (29) etc. are also notable. In monthly scenario on e-resource database (33) and accessing patron's account (20) are notable. The respondents have a kind of fascination in case of using mobile browser for surfing Internet. They mostly prefer Google Chrome (86). They said that Chrome is much user friendly mobile browser than others. Table 12 represents their browser preferences that besides Chrome they also prefer UC Browser (64), Mozilla Firefox (36), Opera Mini (7) and others (9).

**Table 12: Preferred mobile browsers**

Browsers	No. of respondents preferred
Chrome	86
UC Browser	64
Mozilla Firefox	36
Opera	7
Others (Where n = 142)	9

In case of downloading articles/study materials from Internet they were found less interested. Table 13 represents that major portion of respondents download very little in a month i.e., < 50(76) and others are as follows 50-100 (37), 100-200(21), 200-300(5) and > 300(3).

**Table 13: Download scenario in a month**

Item	< 50	50-100	100-200	200-300	>300
Respondents (n = 142)	76	37	21	5	3
%	53.52	26.06	14.79	3.52	2.11

### 5.3 Awareness/Intention of using Library Services through Library Applications (App) (Phase III)

#### 5.3.1 Preference/awareness of Library app

The respondents were questioned what kind of library services they prefer mostly whether they prefer library app or mobile library site or both of them. Table 14 represents that 70 percent approx. (actual figure 69.76%) users demand for effective library app, mobile library site (25.85%), both (16.34%) and others (7.80%). Table 15 represents

that only 56 (27.32%) out of 205 respondents are aware of any kinds of library apps and 149 respondents (72.68%) does not aware about it. Some NIT libraries like NIT Delhi, NIT Rourkela and NIT Hamirpur also started to provide library services through library apps. Table 15 reveals that only 58(28.29%) respondents aware about it and rest 147(71.71%) of them do not aware of. Recently National Digital Library of India (NDL) library app which is designed by Indian Institute of Technology Kharagpur and funded by MHRD, Govt. of India has got very popular among higher educational institutes across the country. The present study aims to measure how many respondents use 'NDL app'. Table 15 represents that 101(49.27%) respondents out of 205 responded that they use NDL through 'NDL App' for their study purposes and also said that it's very effective information sources. 104 respondents do not use still now but some of them confirmed that they aware about it and they are in a way to use it very soon.

**Table 14: Intentions to use Library Applications (App)/Mobile Library Sites**

Item	Prefer Library App	%	Prefer Mobile Library Site	%	Prefer both	%	Prefer others	%
Respondents (n = 205)	143	69.76	53	25.85	33	16.34	16	7.80

**Table 15: Usage/Awareness Status of different Library Apps**

Respondents	Any Library Apps	%	NITR, NITD, NITHLibrary App	%	NDLApp	%
Use/Aware	56	27.32	58	28.29	101	49.27
Not use/Not aware (n= 205)	149	72.68	147	71.71	104	50.73

### 5.3.2 Components of Library app

Basically the respondents were asked through different questions which components they intended to have in the library app. In case of mobile reference services they prefer Instant Messaging (IM) mostly. Table 16 explores that 114 out of 205 respondents prefer IM. They said that through IM, they can instant communicate with library authority. They also prefer text messaging (89) and social media (88). With the escalation of social media, they were questioned which social applications library should prefer for its news update. Table 17 indicates that major respondents (163) prefer Face book, then prefer blog (77), twitter (73), Whatsapp (28) and other (34) respectively. The respondents were specifically

offered a set of seventeen (17) mobile library components or services to choose as they prefer. They were given to choose any mobile library services as they intend. Table 18 reflects that they only preferred fourteen (14) out of seventeen (17) types of services. A rating such as 'High preference' (>100), 'Average preference' (50-100) and 'Low preference' (<50) has been made based on the scores of different mobile library services. Score of a particular service denotes the number of respondents choose that particular service.

**Table 16: Mobile Reference Services**

Item	IM	Text/SMS	Social media
Respondents (n =205)	114	89	88

**Table 17: Media for Library News update**

Item	Face book	Twitter	Blog	Whatsapp	Others
Respondents (n = 205 for each)	163	73	77	28	34

**Table 18: Core Components of Library App**

Components of Library App	No. of Respondents Preferred	Rating
m-OPAC	187	High preference (>100)
m-database (e-resource database)	179	
Mobile Library Site	104	
Contact us	100	Average preference (50-100)
Follow us on social media	100	
A/V class lectures online	96	
Ask a librarian	94	
Renewal/Reservation of books online	84	
Feedback	73	
Library hours	60	
Mobile video tour	51	
Mobile instruction	46	Low preference (<50)
Library FAQ	32	
Mobile printing(n = 205)	31	

Table 18 represents that m-OPAC (187), m-database (e-resource database) (179) and Mobile Library Site (104) are come in 'High preference' (>100) as preferred by large no. of respondents. Then Contact us (100), Follow us on social media (100), A/V class lectures online (96), Ask a Librarian (94), Renewal/Reservation of books (84), Feedback (73), Library hours (60) and Mobile video tour (51) are come in 'Average preference' (50-100) as preferred by average no. of respondents. Then Mobile instruction (46), Library FAQ (32), and Mobile printing (31) are come in 'Low preference' (<50) as preferred by least no. of respondents.

## 6. Conclusion

The study demonstrates that the 98 percent library users of National Institute of Technology, Durgapur use smartphones. The ways of using smartphones are highly determined by smartphone versatility, multi-functionalities, size and portability (Dukic and Chiu, 2015). The study also confirms that mobile devices have indeed become commonplace tools serving a wide array of purposes that include teaching and learning alongside work and leisure amongst respondents (Kukulka-Hulme and Pettit, 2009). The respondents were found Internet addicted. Mostly they use search engines on daily basis for accessing different kinds of information for their studies. Besides their study, they also spend time on social media, entertainment activities like games, music and video etc.

Leading percent (69.27) respondents access library through their smartphones on daily and weekly basis. They mostly use Google Chrome browser for accessing. For a very short time range (< 1 hr. and sometimes 1-2 hrs.) they access library over smartphones and within that time they mostly use

e-resource database for studying and use OPAC for locating books and other related documents. While downloading any articles, e-books etc. and saving it for further study they prefer laptops not smartphones. They use smartphones only for surfing purposes that's why they do minimum downloads (< 50) through it. Overall 60.49 percent out of 205 respondents are satisfied after using library but 39.51 are not satisfied. They mentioned the reasons of their dissatisfaction are slow Internet connectivity with slow Wi-Fi, not accessible library sometimes, lack of resources and not compatible with mobiles etc.

While giving weightage between library app and mobile library site, major respondents (69.76 %) prefer library app. They have a kind of familiarity of using National Digital Library of India (NDL) app. Approx. 50% respondents (49.27% actual figure) are using NDL app and commented that NDL is very effective for study. 28 percent out of 205 respondents also aware about library apps used by NIT Delhi, NIT Rourkela and NIT Hamirpur. With the rapid growth of social media, they want Facebook mostly for library's news update and Instant Messaging (IM) to communicate with library authority instantly. Out of many mobile library services they have given high preference to 'm-OPAC', 'm-database for e-resources' and 'user friendly mobile library site'. They also given average preferences to 'Contact us', 'Ask a Librarian', 'Feedback', 'Reservation of books online' etc. and low preferences to 'Library FAQ', 'Mobile instruction' etc.

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#### **Acknowledgement**

We are very much grateful and thankful to the Library Authority, Students and staff members of NIT Durgapur for giving such kinds of this opportunity to fulfil our study.

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