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## Educational Use of Smartphone among University Students: A survey of world-ranked universities in Pakistan

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# Educational Use of Smartphone among University Students: A survey of world-ranked universities in Pakistan

## **Abstract**

The purpose of this study was to investigate the usefulness of smartphones in achieving educational goals. Moreover, this study also explores the required library services that should be accessible via smartphone. A quantitative research approach was adopted and a self-administered questionnaire was distributed among those students who currently using smartphone to answer the survey. Descriptive statistics were applied to analyze purpose of the students in relation to use their smartphone. The findings indicate that the university students had positive attitude to use the smartphone for academic purposes on average and across the board. They used the smartphones on the basis of priority to prepare class assignments, searching and reading course related material, watching online lecture and sharing information with their class mates. They recommended that Information about new arrivals of books, e-journals, library events, e-books, online tutorials, OPAC and e-databases are preferred services which should be accessible via smartphone. This study provides useful insights for academic institutions to offer the online learning platform supported via smartphone and also helpful for librarians to offer smartphone based library services to the library patrons.

**Keywords** Smartphone, Usefulness, Educational use, Library services

## **Introduction**

Evolution and development of new technology has been significantly embedded in our daily lives over the past decade, especially, smartphones which become the central technology of 21<sup>st</sup> century. It is an inseparable part of our daily lives due to extensive use of cellphones in business, education and other purposes. Today, almost everyone has been using third or fourth generation smartphones devices. These devices possess a higher level of knowledge and communication with people not only within social circle but also outside of it (Suki and Suki, 2007). People don't consider smartphone just as devices for making phone calls, sending messages and browsing website instead a multiple use device which brought radical shift in human behavior, lifestyle and status (Shin, 2012; Alfawareh and Jusoh, 2014).

According to the Pakistan Telecommunication Authority (2020), there are 169 million smartphone subscriber in Pakistan. Kemo (2020) reported that the number of smartphone connections increased 9.6 million between January 2019 to January 2020 in Pakistan. It shows that the penetration rate of smartphone has been increased five times higher than in 2014 (Statista Research Department,

2016). The increase demand of smartphones among customers including students has made it unlimited consumer demand. Students are digital natives and more addicted of smartphones. Studies have identified that students have used diverse range of smartphone apps for learning purpose, social interaction, accessing information, reading e-books, listening to podcasts, etc. (Kukulka-Hulme *et al.* 2011). Continue evolvement of smartphone apps have the capability to enhance the student learning and improve academic achievements. They used smartphone apps to access course material, prepare assignments and presentation, interacting with classmates and teachers, file sharing, OPAC searching and taking notes (Dukic *et al.*, 2015; Bradley and Holley, 2013). The increase of smartphone technology is also evidence in the web survey conducted at Hunter College New York. Students have their personal smartphones and used it to navigate the library's databases, retrieve online information, search out the catalogue, and access the e-books/journals. They not only used them for recreational purpose but also for educational purpose (Andre Becker *et al.*, 2013). Although, there is a great use of smartphone among university students in Pakistan, the instant research investigating their use for academic purpose and as well as the preferred smartphone based library services among top ranked university students. .

### **Study purpose and research questions**

Recent literature on smartphone indicate that the use of smartphone has been raised in contemporary years, particularly among university students. The smartphone devices are typically used for social networking and entertainment purposes (Dukic *et al.*, 2015). There has been little research about smartphone in the university settings and especially in the perspective of library services which integrate with smartphones. The current study stated here was designed together the evidence about the academic purpose and usefulness of smartphone, and also to explore the priority of students about library services accessible via smartphone, from a developing country perspective. For the recent research, the following research questions were investigated:

- Q1. What are the purpose to use the smartphone for academic purposes?
- Q2. How much the usefulness of smartphone in achieving academic goals?
- Q3. What are the required library services that should be accessible via smartphone?

### **Literature Review**

This section presents a detailed review of the related studies conducted to investigate the use of mobile phones among students.

## **Purpose to use the Smartphone for Academic Activities.**

Due to the increase in the functional abilities and in the aptitude of smartphones, its use has become very common in the academic setting. There are various studies regarding the purpose and use of smartphones in academics. (Ehnle, 2020) has discussed about the ways in which smartphones prove useful for students and they claim that it has even become an accepted phenomenon for students to use smartphones in educational institutions – a concept which used to be frowned upon a while ago. Similarly (Ifeanyi & Chukwuere, 2018) conducted a survey and concluded that the purpose of smartphones in academic activities lies in the fact that students can have unlimited and vast access to any sort of information at any place, any time. The study by (Demiraj, 2016) provides the readers with the idea that both the teachers and students can access books and various scholarly articles or journals conveniently by using their smartphones and can make the learning process easier and more interesting.

The use of smartphones provides the students as well as the teachers with a sense of creativity by relating documentaries or certain multimedia with the lecture. Gone are the times when it used to cost students a fine number of their time and energy to search for complicated words in dictionaries. Students can simply look it up in their smartphones and can even read the news (Ehnle, 2020). With the advantage of having a smartphone in hand 24/7, the students can benefit from quick and speedy browsing services; they can access books or reading materials online no matter what the circumstances are in their personal lives; they can keep up with the latest news, information or trends and can acquire so much in academia due to the mere absence of unneeded struggle (Abdulrazzaq & Al-Ani, 2018). The fact that the camera function of the smartphone enables the academics to capture pictures of lectures; the video and sound recording function enables them to record lectures to bring into use later; and the search engines and E-learning enables them to look up information online – verifies how purposeful smartphones have proved to be (Ifeanyi & Chukwuere, 2018).

The idea of gaining quality education without acquiring the facility of smartphones is unachievable in the modern dynamics of the world of today. Research has been made immensely easy by the use of smartphones. Before this facility was commonly used among students, the process of conducting a thorough research would take months or even years but convenience has been a very positive point ever since smartphones became handy. Smartphones have been helpful in reducing the burden and stress of carrying heavy books around and spending hours in looking for the right material

in those books. It has even slowly started to replace books because students find it easier to type their assignments and to submit it online rather than working on a handwritten task. Teachers also prefer online submissions instead of receiving bundles of written work (Sonne, 2016). Smartphones have provided all the people in the academic settings with the advantage of sharing their work with each other; reviewing others' work by downloading certain reports or articles from the internet; taking part in various surveys on the web and also signing various petitions online (Kumar, Sumi, Verma, & Verma, 2019).

### **Usefulness of Smartphones for Academic Activities.**

The technology of smartphones has become an integral part of the lives of individuals, especially those who are part of the education sector. Its uses are immense and it provides individuals with a lot of facilities which makes it hard to live without this gadget in the modern world. Having a smartphone in pocket can be considered equivalent to walking with the information of the whole world in just a click away (Fawareh & Jusoh, 2017). Smartphones have helped the students as well as the teachers greatly in achieving success in academics. Through its use, learning, along with all the other academic activities have become far easier and time-saving. The constant state of being connected with the world and having any sort of information just a tap away is a great privilege and that privilege is available to students on a personal as well as on a professional level (Sonne, 2016).

Study shows that there are numerous positive outcomes of using smartphones in academia. There are several certain educational institutes that have started teaching courses online and various professors have begun to conduct tests and quizzes online as well. The use of smartphones for academic purposes has helped the users in increasing their productivity and creativity and therefore study proves that its usage should be further amplified among faculty as well as students (Kumar, Sumi, Verma, & Verma, 2019). It has been observed by various scholars that using smartphones for academic learning increases individuals' social skills and the thirst to participate more and to engage in a more cooperative style of learning by being able to easily share and discuss work with fellow students/researchers and supporting them in their work (Ifeanyi & Chukwuere, 2018).

Ever since their use became common among people, there has been a major rise in the popularity and uses of smartphones. As the technology kept evolving, there also came various applications and a globally applicable search engine called Google that benefits users in all ways

possible (Fawareh & Jusoh, 2107). The usages of digital cameras, clocks, sound or video recorders, calendars, calculators, digital watches, beepers, etc. have all been replaced by smartphones and this replacement has provided the users with great convenience, comfort and the ability to save time and unnecessary effort (Darko-Adjei, 2019). Those who love to gain knowledge have benefitted a lot from the advantage of being able to get an access to information through online sources at any time (Sarwar & Soomro, 2013). The fields of contemporary studies have risen to a great extent and its credit goes to smartphones, internet and social media. Because of these facilities, the world has now become a global village and it is tremendously unchallenging to get connected to the entire world. Therefore, fields like International Relations or Political science have flourished a lot because social media platforms such as Facebook or Twitter have enabled the users to know about the events happening in any part of the world and to get an analytical viewpoint of various different communities.

### **Library Services and Resources via Smartphones.**

With the advent of smartphones and internet, the methods and procedures of learning have changed and have become unlimited. It is no more the requirement of quality learning that one has to be limited to a specific place, be it a library or a lecture room. Knowledge can be gained regardless of the geographical position of the individual (Darko-Adjei, 2019). The way there has been a hike in the usage of smartphones in academia, it seems apparent that library services will be availed through cell phones as well in the near future (Liu & Briggs, 2015). In fact, E-libraries and E-books have already started to show their prominence.

Technology has provided the readers with a great advantage when it comes to availing library services. Through the use of smartphones, this service has become quite easy and affordable to access by the users. Universities and other various institutions provide the users with digital libraries, making it seem like having access to a whole library at home or offices at just the palm of their hands (Wadhwa, 2019). Unlike actual libraries, acquiring library services through smartphones is quite speedy and time saving. It does not take users much effort or time to look for certain books or publications and neither do users have to worry about returning the issued books at a specific time. there is no limit to how long a user can benefit from the publication. In fact, all the books are just a tap away and can be acquired at any time or any geographical location.

Libraries have always been the biggest source of knowledge. They always provide individuals with as much effective services and as well as information as possible (Sharma & Sahoo, 2014). But with the advent of technology, the notion of visiting libraries and spending a fine amount of time there has changed. Though many prefer the old ways of going to libraries and being accommodated with the serene and silent environment, it still cannot be denied that acquiring library services via smartphones is much easier and convenient. Along with the facility of having a reach to the library services from home or offices, smartphones can also prove to be helpful while a student is in the library. Many institutes have made advancements in their systems and have made it easier for students to find a book or any publication by enabling them to write the author's or the book's name in the digital library application so that it can tell the user about the exact location of the book being found in the library. Such level of ease would not have been possible without the usage of smartphones or without the advancement of information technology (IT).

### **Methodology**

Quantitative research method based on survey research strategy has been used in this study. According to Kerlinger (1986) “survey methodology is a useful tool for educational fact findings and a mean by which a great deal of information can be obtained from the population”. This study investigates the academic use of smartphone among students. It also investigates their opinion about the required services from libraries that can be accessible via smartphone devices. The population of this study was university students studying in top four world-ranked Pakistani universities which have qualified to the world top 1,000 university ranking of Times Higher Education (The Nation, 2017). These universities include Quaid e Azam University (QAU) Islamabad, National University of Science and Technology (NUST) Islamabad, CMOSAT Institute of Information Technology Islamabad and University of Agriculture (UAF) Faisalabad. As the total number of students studying in these universities was un-known to the author and it was also hard to collect data from all the students studying in these four universities. To overcome this issue, convenient sampling technique was used to target 100 students for data collection from each university. A self-administered peer-reviewed questionnaire was used as a survey instrument to collect data from the respondents. Total 400 questionnaires were distributed among students studying in above mentioned four universities. Out of four hundred questionnaires, 318 were returned and the response rate was 79%. The collected data were analyzed through SPSS by using descriptive and non-parametric statistical techniques.

### ***Data Analysis***

### *Academic and demographic Information*

A total 318 respondents participated in the survey. As Table I illustrates that the largest group of respondents (29.6 percent) was from Quaid-e-Azam University of Islamabad which is ranked the top universities of Pakistan according to Higher Education Commission (HEC). The next large groups was from NUST University of Islamabad (25.2 Percent) and University of Agriculture Faisalabad (23.9 Percent). While the last and the smallest group (21.4 Percent) was from COMSAT University of Islamabad. Out of 400 questionnaires, 318 valid questionnaires were received and hence, the response rate was 79.5 percent. While, gender of the respondents revealed that male respondents were to some extent numerous (54.1 percent) than female respondents as shown in (Table II).

The age group of respondents has shown that the group aged between 16-20 years (37.7 percent) is the most represented one. The second largest age group is 21-24 years (36.8 percent) followed by the age group 25-29 (19.5 percent), 30-35 (4.1 percent) and the older than 36 years (1.6 percent). The distribution of age groups shows that young generation which called digital native generation predominantly participated in the survey.

**Table I.** Breakdown of responses by different universities

Universities	Frequency	Percentage
QAU	94	29.6
NUST	80	25.2
UAF	76	23.9
COMSAT	68	21.4
Total	318	100

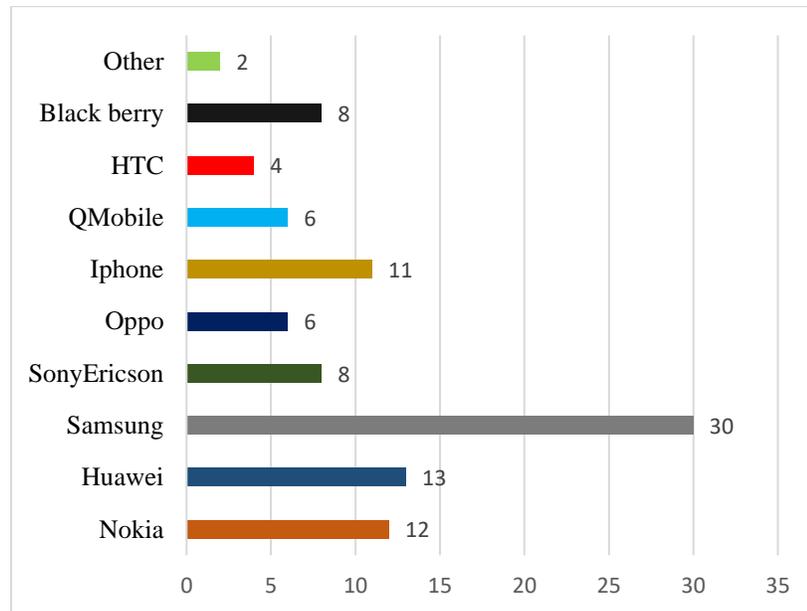
**Table II.** Gender wise distribution of respondents (n=318)

Gender	Frequency	Percentage
Male	172	54.1
Female	146	45.9
Total	318	100

Respondents were studying in undergraduate classes, Masters/ MPhil. and PhD degree programs. However, a significant number of students (45.9 percent) were enrolled in undergraduate programs while 28.9 percent were pursuing their degree in PhD program and the remaining 24.5 percent were study in Master/MPhil. degree program.

### *Types of smartphone brands*

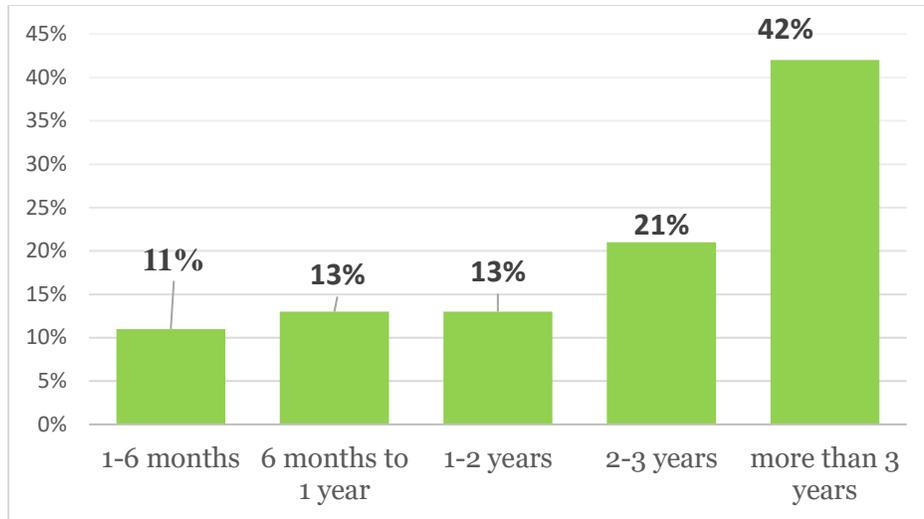
Figure I shows the responses regarding types of smartphone brands used by the respondents. According to results, significant number of respondents (30 percent) indicated that they have Samsung Galaxy followed by Huawei (13 percent), Nokia (12 percent), iPhone (11 percent), Sony Ericson and Black berry (8 percent), OPPO and QMobile (6 percent). Few of the respondents (4 percent) had HTC phone and only two percent had LG, Motorola and Lenovo.



**Figure I.** Brands of smartphones

### *Duration of experience to use smartphones*

As shown in Figure II., the largest number of respondents (42 percent) had experience to use smartphones for more than three years followed by 21 percent respondents had 2-3 years of experience and only 11 percent had 1-6 months of experience as shown in **(Figure II)**.



**Figure II.** Experience in using smartphone devices

*Preferred modes to use the Internet*

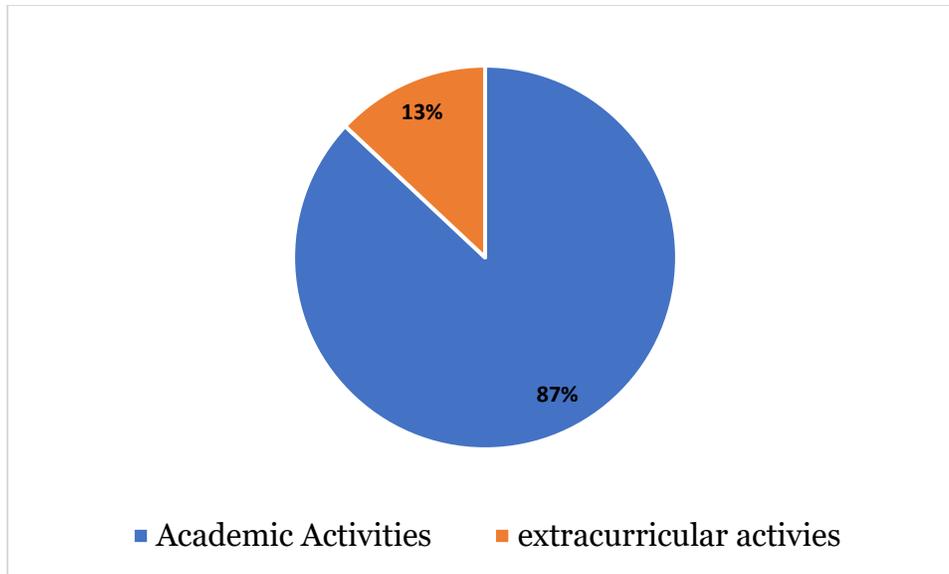
Respondents were asked to mention the modes of accessing Internet. Results show that a significant number of the respondents (67.3 percent) use Internet via smartphones while one fourth participants (28.3 percent) used Internet from their laptops followed by 3.1 percent through library and only 1.3 percent from cafe as shown in Table III. However, their responses show a very marked preference to use Internet on their smartphones as smartphone are portable and convenient to use at everyplace.

**Table III.** Modes to use Internet

	Via Smartphone	Via Laptop	Through Library	Through Internet Cafe
Frequency	214	90	10	4
Percentage	67.3	28.3	3.1	1.3

*Purpose to use the smartphones*

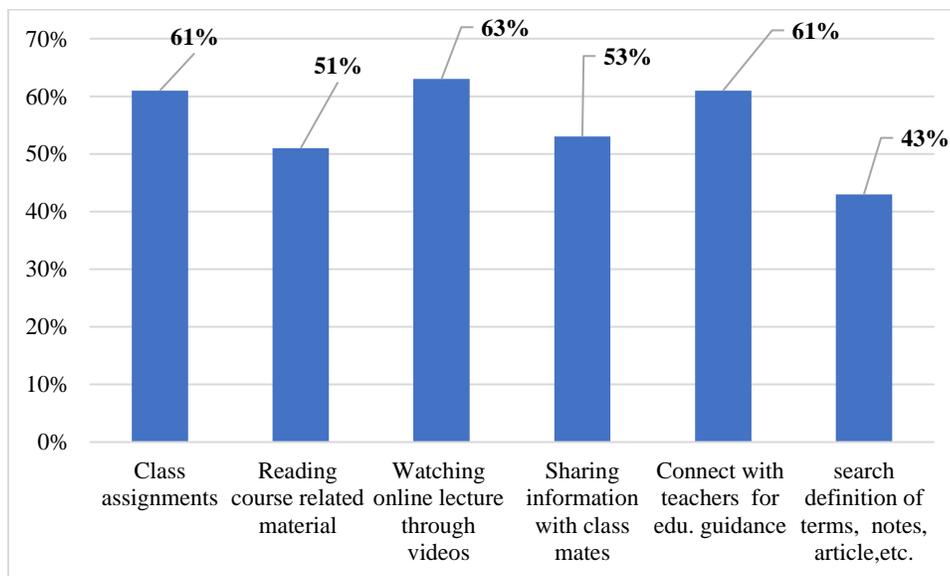
A significant number of students (87 percent) indicated that they use the smartphone for academic purposes while few (13%) students use them for extracurricular activities. **Figure III** clearly indicates the increased use of smartphone for academic purpose among university students.



**Figure III.** Purpose to use Internet on smartphone

*Specific academic activities via smartphone*

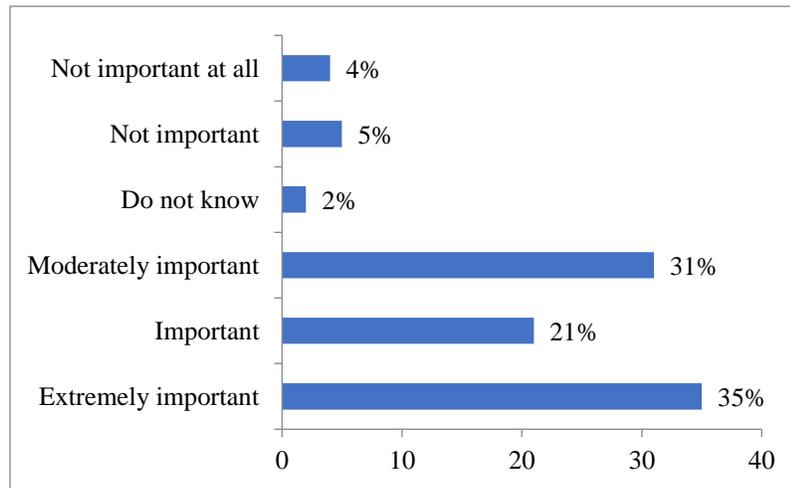
Respondents were asked to indicate their specific academic activities for which they used smartphones. It was found that more than half of the respondents (61 percent) used smartphones to prepare class assignments, reading course related material (51 percent), watching online lecture through videos (63 percent), sharing information with class mates (53 percent) and to connect with teachers and peers for educational guidance (61 percent). While only 43 percent respondents' used smartphone to search definition of terms, searching online notes, article, ppts (Figure V).



**Figure IV.** Specific academic activities via smartphone

### *Importance of smartphone in achieving academic goals*

**Figure V** demonstrates the importance of smartphone in achieving academic goals. It is remarkable that large number of respondents considered smartphone extremely important, 31 percent moderate important while 21 percent considered it important.



**Figure V.** Smartphone in achieving your academic goals

### *Usefulness of smartphone for academic purposes*

To understand how much smartphone is useful for academic purposes, the respondents were asked to rate their opinion on five-point Likert scale. Respondents strongly agreed that smartphones provide easy access to Internet, it helps them in their studies when they are away from their computers. The given table shows that they were also agreed with rest of the statements regarding usefulness of smartphone for academic purposes (see table V).

**Table IV.** Usefulness of smartphone for academic purposes

<b>Statements</b>	<b>Frequency</b>	<b>Mean</b>
Smartphone makes it easier to access Internet	315	4.57
It helps me in my studies when I am away from computer	315	4.57
It makes easier for me to search required information	314	4.45
It is highly useful to connect with information/teachers/peers and class mates	313	4.21

It helps me to share academic resources with class mates.	311	4.19
It helps me to access social networking sites for academic purpose	315	4.12
It is useful in achieving academic goals	309	3.84
It improves my overall academic performance	311	3.58
It helps me to complete my course assignments	313	3.82
It helps me to create personal academic schedule	315	3.65

*Required library services accessible through smartphone*

Currently, the trend to use smartphone based library services is not common in most of the university libraries of Pakistan. The researchers explored the library websites of targeted universities (QAU, NUST, COMSAT & UAF) and found that they don't offering proper access of library services via smartphone devices. So, it was necessary to explore the students' opinion about the required library services that can be accessible via smartphones. Findings revealed that most of the respondents "agreed" that they want to access online resources (Mean 4.13) followed by E-books (Mean 4.05), online tutorials (Mean 3.99), e-journals (Mean 3.97), and digital libraries (Mean 3.93), on their smartphones as shown in (Table V).

**Table V.** Library Services on Smartphone

Statements	Frequency	Mean
Online reference sources (dictionary, encyclopedia etc.)	310	4.13
E-books	314	4.05
Online tutorials	313	3.99
E-journals	314	3.97
Digital libraries	310	3.93
Research assistance	311	3.90
Access to library online catalogue	313	3.88
E-databases	313	3.87

Information about new arrivals of books	315	3.82
Current Awareness Service (CAS)	308	3.82
Online book reservation	311	3.78
Library events/calendars	314	3.65
Reference service (Ask a Librarian)	310	3.65

## ***Discussions***

In this study, we observed that the digital native generation of university students studying in world-ranked Pakistani universities are accessing Internet through their smartphone devices. This result confirms the report of Express Tribune (2017) that in Pakistan around 40 million of users are connected to the Internet through their smartphone and accessing 3G/4G Internet services. Samsung was the most used smartphone brand by university students. This confirms the survey results by Alfawareh and Jusoh (2014) and Pažur, (2014) which revealed that Samsung is the most dominant brand among students. The study found that around 87 percent students used smartphone for their academic purpose. These findings are in accordance with (Andre Becker, *et al* (2013); Dresselhaus and Shrode (2012); Woodcock *et al* (2012); Dahlstrom *et al.* (2011) who found that smartphones devices are being used by the students for educational, academic and learning purposes. However, Bomhold (2013) in his study found the use of smartphone for entertainment purpose. Majority of respondents mentioned that they use smartphones to watch online lecture through videos. They were also using it to prepare their class assignments, connect teachers and peers for educational guidance. It shows the importance of smartphone to watch the videos of other scholars for increasing knowledge. This finding is also in line with Bradley and Holley (2013).

Respondents were asked that how important they found the use of smartphone in achieving academic goals, they agreed that the use of smartphones help them to access the Internet, it helps in studies when they are away from computer, it is useful to connect with information/teachers/peers and class mates. They found it as a useful tool to share academic information and resources with their class mates.

Respondents were inquired about the required library services they want to access through their smartphone devices. Findings revealed that they were interested to use number of library services and those include the use of online reference sources (dictionary, encyclopedia etc.), e-books, online tutorials, e-journals e-databases, CAS, library OPAC, information about new arrivals, online book

reservation, digital library services, ask a librarian service and information about library events. These findings appear in accordance with Bomhold (2013), Bibby (2013) and Patrick *et al.* (2016).

Analysis of results established that still the use of smartphone to access the library resources and services is new in Pakistan even in world-ranked university libraries. Only few libraries are offering very limited library services that can be accessible through smartphone devices. Students studying in world-ranked universities of Pakistan are bound to use their laptop and desktop computers to access library services. Hence, findings of this research show the dire need in university libraries of Pakistan to offer library services that can be accessible through smartphone devices to bring the library services to the users.

### ***Conclusions***

The use of smartphone among university students is very common in Pakistan and they are using it as a preferred source to access online information resources. They have very positive attitude towards the use smartphone for academic purposes. They use it for watching online lecture through videos, class assignments, sharing information with class mates and connecting teachers and peers. As per results of this study, the use of smartphone is extremely important in achieving academic goals. University students studying in Pakistan prefer to access library services via smartphone. Hence, there is need to offer smart library services that can be accessible through mobile phones.

### ***Recommendations***

Use of smartphone should be encouraged in educational institutions of Pakistan. University libraries of Pakistan must meet the information needs of digital natives and design their library services that could be accessible through smartphone devices. It is strongly recommended that university libraries in Pakistan should offer smartphone based library services such as the use of online reference sources (dictionary, encyclopedia) e-books, online tutorials, e-journals e-databases, CAS, library OPAC, information about new arrivals, online book reservation, digital library services, ask a librarian service and information about library events.

### ***Practical Implications***

This study is practically important for library community to design their library services that can be accessible via smartphones. This study identifies required library services which should be accessible via smartphones. So, this study is important for libraries to successfully introduce their services among new generation.

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