THE USE OF SMARTPHONE IN ACCESSING INFORMATION:

A CASE OF DHAKA UNIVERSITY STUDENTS

Thesis submitted to the Department of Information Science and Library Management, University of Dhaka as a partial fulfillment of the requirements for the degree of Masters of Arts (MA)

Submitted by

Examination Roll: 2522

Registration: Ha-6711

Examination Session: 2013-2014

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December 2014

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Certificate

This is to certify that Md. Emran Hossain a student of M.A 22nd Batch, Examination Roll-2522, Department of Information Science and Library Management, University of Dhaka has successfully completed his "Thesis" entitled "The Use of Smartphone in Accessing Information: A case of Dhaka University Students" under my supervision as the partial fulfillment for the degree of Masters of Arts.

He has done his work according to my supervision and active guidance. I think this thesis paper will help him in the future to build up his career. I wish his success and prosperity.

Supervisor

Declaration

This is to certify that the research entitled "The use of Smartphone in accessing information: A case of Dhaka University Students" is my own work and to the best of my knowledge and belief it contains no material previously published or written by any other person. The whole research work was counted by me under the guidance and kind supervision of my supervisor.

I further submit the thesis has not been previously submitted in partial or in full by me for any degree or diploma to any University or Institute.

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Date: December 2014

Dedicated to

My beloved parents

Acknowledgement

I would like to pay my heartiest thanks, unbound gratitude, sincere appreciation, and deep sense of respect to my *Supervisor* for his enormous support, guidance, valuable suggestions and affection throughout this research work. I am really grateful to him as he volunteered his time and expertise in reviewing my thesis again and again. Without his direction, constant inspiration, valuable advice, constructive criticism, stimulation and consideration, the accomplishment of this work would not have been possible. I am also greatly obliged to all of my respected teachers whose patience and support appeared infinite. Their cordial cooperation, encouragement, serenity and suggestion helped me a lot at every step of the thesis.

I would like to thank the respondents of Dhaka University who contributed valuable feedback and provided information to help shape my research work. I am also thankful to my classmates and others students of the Department of information Science and Library Management, University of Dhaka for providing important research information. Special thanks to my friends who always inspired me.

My roommates at Sergeant Zahurul Haque Hall also helped with MS-Word and Excel. I am also grateful to them. I wish to thank my family member for their encouragement. My parents and my elder brothers have always been supportive. This research would not have been possible without their constant help and encouragement.

Abstract

This Study aims to present an overview of the use of smartphone in accessing information by the students of Dhaka University. It helps to locate the possible advantages and relative drawbacks regarding the use of smartphone in accessing information from internet. The survey method with a structured questionnaire has been employed to conduct the research. The data was collected from different faculty & institute for the balance of the study and findings. The data was collected from both graduate and undergraduate. All the questionnaires were duly coded after editing for computer input. Questionnaire was analyzed using statistical software SPSS program version 11.5, and MS word, MS Excel. Mann-Whitney (M-W) and Kruskal-Wallis (K-W) tests were conducted to further analyze the influence of students' demographic and individual characteristics on their opinions on possible academic uses of smartphone. The result of the study shows that the status of smartphone usage by the students of Dhaka University is satisfactory. The findings of the study indicate that the students of Dhaka University provide their consensus regarding the use of smartphone in accessing information from internet. This research provides evidence on the actual use of smartphone by the students of Dhaka University for accessing information and their attitude towards implementing an online or internet based study system for Dhaka University.

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List of Abbreviation

DU	Dhaka University
DUL	Dhaka University Library
ISLM	Information Science and Library Management
PC	Personal Computer
DC	Dhaka City
OLC	Online Library Catalogue
OPAC	Online Public Access Catalogue
LBSN	location-based social networks
LBMG	location based mobile games
SMS	Short message service
IBM	International Business Machines Corporation
BYOD	Bring Your Own Device

Chapter 1
Introduction

1.1 Introduction

Smartphone is one the most popular communication devices in this modern world. It is a mobile phone running on a complete operating system in a manner similar to a traditional computer, which offer advanced computing abilities and connectivity options. These features enable new kinds of mobile services that in turn shape the usage habits of smartphone users (Alfawareh & Jusoh, 2014). University students are among the highest contributors to the increasing number of smartphone sales. The factor that most influences the increase in smartphone usage is the functionality that helps users in their daily life especially business people and university students (Jacob and Isaac 2008).

The first smartphones were released in the year 2000. It was manufactured by Ericsson and the model was called R380. Actually, this was the first time when this type of gadgets, a merging between a cell phone and computer functionality, was called a "smartphone". With the help of mobile users, a smartphone has become a very desirable device. Nowadays, smartphones have been used to replace desktop or mobile computers. All activities which can be performed on normal computers such as sharing information, sending and receiving emails, chatting, opening and editing documents, can be kept inside a pocket of a trouser or a shirt. Some smartphones have sophisticated applications such as a camera which can work as a scanner. As smartphones provide more and more applications for an increasingly a wider range of usage situations, they have become an increasingly integrated part of people's everyday life (Alfawareh & Jusoh, 2014). After a whole day's working, people could check out their daily activity record on the phone, and they will have a clear picture of their physical activity performance during the day. Then they can adjust their later exercise plan based on the physical activity record to achieve the best exercise and losing weight effect (Zhang, 2012).

Early in 2013, smartphones overtook mobile phones by claiming a greater share of cellular device sales for the first time ever. This indicates a worldwide shift towards more accessible computing power held in the hands of individuals (Svensson, 2013). The mobile phone was at one point a visible symbol of status, but now many would

consider any device without data capabilities to be from the stone ages (Geser, 2004). However, the convergence industries with smartphone based mobile communication network needs more academic and industrial efforts to following techniques of current smartphone device. For example, most of new products that have additional functions are rapidly developed and produced periodically. Designing and developing techniques of a smartphone system have become more complicated for applying new emerging technologies (Kang *et al.* 2012). The main aim of this exploratory study is to assess the academic use of smartphones among Dhaka university students.

1.2 Smartphone

Smartphones have advanced features in addition to the standard functionality offered on a feature phone, such as the ability to send and receive text messages. They are equipped with the capabilities to display photos, play games, play videos, built-in camera, audio/video playback and recording, send/receive e-mail, built in apps for social websites and surf the web, wireless internet and much more. In general, a smartphone has an operating system that allows a user to do many of the things that were once reserved for a personal computer, such as accessing the web at higher speeds, viewing/editing documents, downloading files, creating music playlists, or managing multiple email/messaging accounts.

A smartphone is a telling indications the voice which allows the user to not only make and receive phone calls, text messages, and voice messages, but also a wide variety of other communications forms as well as the ability to run productivity and convenience applications and enjoy multimedia. A smartphone is able to do a wide variety of functions since it is at its core a simplified handheld computer device. This is of course, a very simple and basic explanation of what a smartphone is. In reality, a smartphone is a lot more than this. It can allow users to increase their overall productivity, make life more convenient, stay in touch with friends and family, or form a wide variety of functions that previously were complicated or time-consuming.

1.3 History of Smartphone

The popularity and range of smartphones has exploded in the last few years, although they first appeared nearly 20 years ago in 1992 (they were not called smartphones back then). Apple first introduced the smartphone in mass consumer market. The different between today's smartphone and early smartphone is that early smartphones were predominantly meant for corporate users and used as enterprise devices and also those phones were too expensive for purely meant for enterprises. During this phase, all the smartphones were targeting the corporations and the features and functions were as per corporate requirements. This era began with the advent of the very first smartphone *Simon* from IBM in 1993. Blackberry is considered as the revolutionary device of this era, it introduced many features including email, internet, fax, web browsing and camera. This phase was totally based on smartphone targeting enterprises. The second phase of smartphone era started with the advent of iPhone, the major breakthrough smartphone market in 2007. Apple revealed its first smartphone at that time. This was the time when first time ever industry introduced the smartphone for general consumers market. End of 2007, Google unveiled its Android operating system with the intention to approach the consumer smartphone market. Following is a brief history of smartphones.

1992: IBM Launch 'Simon'

Simon was the nickname for the first phone launched which could do much more than make and receive calls and send texts. It was incredibly advanced for the time and offered amongst other things a calendar, world time, address book, notepad, email and even had a touchscreen. Priced at $899.00, it was only available in the US.

1996: Nokia 9000

During the late 1990s, Nokia launched a range of phones aimed at business users. This range started with the hinged Nokia 9000, which was a cross between a phone and a PDA, and was quickly followed by the 9210, 9300 and 9500. The Nokia 9210 was one of the first phones to use an open operating system.

1997: A Smartphone is born

The first handset to actually be called a smartphone was the strangely named *Penelope* from Ericsson. This was a concept phone and only around 200 units were ever made, but it paved the way for Ericsson to develop the R380 a few years later.

2000: Smartphone is sold

Ericsson's development of their concept phone *Penelope* led to the launch of the R380 in 2000, the first phone to be marketed as a smartphone. It featured both communication and PDA functions and used a clever touchscreen which could be covered by a hinged keyboard when it was being used to make calls. The R380 was the first commercially available smartphone to use the Symbian OS.

2002: Mobile Media Platform

The year 2002 was a busy year for smartphones and saw the release of the Palm Treo with its full query keyboard, the P800 from newly merged Sony Ericsson and the first ever Blackberry. The P800 added several new features to the smartphone market, including a MP3 player and a color touch screen. Blackberry concentrated on providing wireless email access, something it continues to do today.

2005: Smartphone or Multimedia PC

Sony Ericsson launches the N-series of smartphones in 2005. This series of phones were initially marketed as mobile multimedia computers. The N-series continued to improve and innovate year after year and has become a favorite of business people.

2007: Apple iPhone Hits the Stores

The much-hyped and subsequently much-loved **iPhone** hits the shops and sells by the bucket load. The Apple brand undoubtedly helps to sell the phone, but it is the success of the App Store in 2008 which keeps it ahead of the game. To date there are close to 200,000 commercial and free apps available to iPhone users, turning the iPhone into everything from an art studio to a spirit level.

2008: The Android Arrives

Developed as an open-source product and backed by Google, HTC, Intel and several other influential companies, Android was touted as the future for smartphone Operating Systems. The first phone to use this new OS was the HTC Dream (or T-Mobile G1 as it was also branded). Android is quickly becoming a favorite OS for smartphone manufacturers and it is thought that there are already 70,000+ apps available.

2009: Several companies launch their own app stores, including Nokia's Ovi Store, Windows Marketplace for Mobile and Blackberry App World. Android sees its market share grow from 3% at the start of 2009 to nearly 20%. It is a fairly quiet year for Apple, with iPhone fans waiting for the new iPhone 4 handset due out the following year. New versions of the iPhone 3 appear, including the 3GS. Many Apple fans object to the wallet-busting price tag for even a standard model.

2010: Apple announces reaching the 3 Billion download mark on its App Store and launches IOS 4 and the iPhone 4 which uses Api's to allow third party apps to multitask. The new iPhone sells in massive amounts but suffers something of a blip when it is discovered that gripping the metal frame too hard can make the signal drop. Android makes huge inroads into the smartphone market and grabs a 20% market share, largely thanks to the release of the Nexus One and some brilliant handsets from Samsung and HTC. Sales of all smartphones increase by 72% in 2010 and make up nearly 20% of all mobile phones sold**.**

1.4 Services of smartphone:

Smartphone users can get a variety other services that are not possible for any other communication devices. Some important services are given below:

- Internet;
- email;
- Weather update;

- Support various apps;
- Self-camera;
- Easy to make a call;
- Easy to bear;
- Short message service;
- GPRS service or Google earth; and
- Video calling facilities.

1.5 The Effects of smartphone on University Students

The effects of smartphone on university students' learning are both positive and negative. Most of the students are in their adulthood and this is a very significant and crucial period of age. Javid *et al.* (2011) stated some positive and healthy impacts and effects of smartphone on students' performance at the university level:

a. contact easily with the teachers, classmates and parents;

b. trace easily the teachers, classmates for the solution of educational problems;

c. use internet to search out the useful information;

d. use the smartphone as minicomputer;

e. use dictionary and thesaurus;

f. read news;

g. listen FM radio for entertainment;

h. make photos and movies;

i. use Bluetooth infrared technology to transfer the data from smartphone to smartphone or to computer and computer to smartphone without any cost in few seconds. In it, data can be transferred even from other smartphone or computer which is 15 to 20 feet away; and

j. handle and carry easily because it is light weight and so on.

1.6 Statement of the problem

The use of smartphone is rapidly increasing in our society. Besides, Dhaka University campus is believed to be one of the largest concentrations of smartphone users in Bangladesh. It would be interesting to see whether Dhaka University students use smartphone for their academic purposes or not and if yes, what types of information they access through smartphones.

1.7 Research objectives

The research objectives are to:

1. explore the perception of the students regarding the use of smartphone in accessing information;
2. find out the change in the level of education among the students due to smartphone;
3. identify which apps are so important   for academic purposes;
4. identify how frequently they use smartphone for academic purposes;
5. find out the opinions about the importance of smartphone for their academic course; and
6. The implication of the use of smartphone to education.

1.8 Organization of the thesis:

The text of the thesis has been organized as a logical progression in the following five chapters including preliminaries.
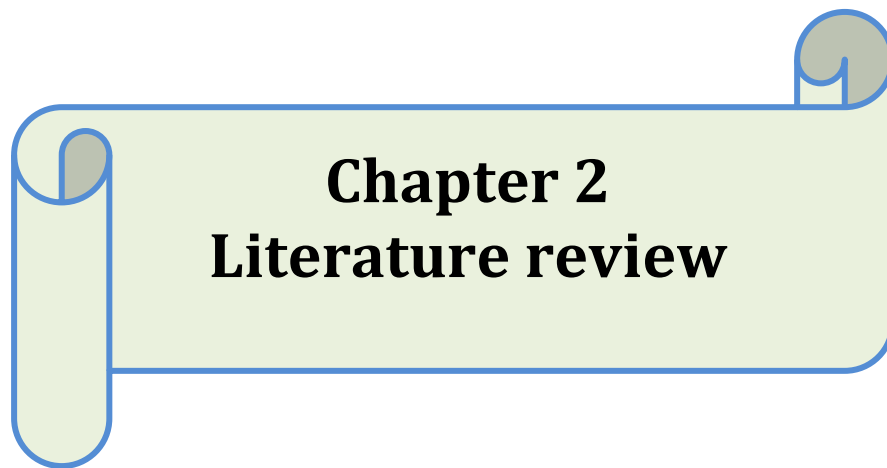
Chapter 1 is devoted to the history, service of smartphone, statement of the problem and objectives of the research.

Chapter 2 deals with review of literature on this research topic

Chapter 3 discusses the methodology adopted in this research.

Chapter 4 deals with analysis and findings.

Chapter 5 provides a summary of the results and conclusions and recommendations of the research.

Chapter 2
Literature review

There are a large number of reports and theoretical works carried out on smartphones. In many of them, research scholars have identified the various functional issues of smartphones. However, only a very few empirical works is available on the academic use of smartphones, especially in the university settings.

Verkasalo *et al.* (2010) explained how smartphones facilitate the potential adoption of new mobile applications. The purpose of this research is to study users and non-users of three selected mobile applications, and find out what really drives the intention to use these applications across users and non-users. The authors measured actual usage of mobile applications in a panel study of 579 Finnish smartphone users, using in-device measurements as an objective way to identify users and non-users. A web-based survey was used for collecting data to test an extended Technology Acceptance Model in explaining intention to use. In this study, map applications and mobile internet, are driven by more utilitarian motivations, whereas games are more hedonic. It is also clear that not everybody are using applications facilitated by smartphones, and therefore the presented approach of studying users and non-users separately provides a new approach to analyze adoption on a practical level.

Sarwar (2013) discussed how smartphones are impacting the society and also how smartphones are going to transform the culture, social life, technology landscape and other diverse aspects of modern society. The aim of this study is to understand all the positive and negative aspects of smartphone on the society. The study primarily focuses on the impact of smartphone on business, education, health sectors, human psychology and social life. The study summarizes the impacts based on wide range of impacts that smartphones have on society. The paper also recommends solutions in order to reduce the negative impacts of smartphones and realizes more benefits of this exiting technology.

North *et al. (*2014) focused on the use and role of mobile phones among South African university students. Four main categories are used to examine the students' mobile phone use: (1) reasons to use mobile phones, (2) pattern of mobile phone use, (3) purchasing factors, and (4) behavior-related issues. Through a quantitative approach data was collected from 362 participants using a survey. The key findings indicate that the main reason why South African university students use a mobile phone is for socializing, as well as for safety and privacy purposes. Usability and price emerged as the top purchasing factors. The respondents showed some signs of addiction to their mobile phones. Differences in mobile phone use by gender were found, with female students showing increased mobile phone use for safety and socializing.

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Alfawareh, & Jusoh (2014) studied the trends in smartphone usage among university students in Saudi Arabia. A total of 324 students from various academic levels and programmes at Najran University, Saudi Arabia participate in a questionnaire-based survey. Among the participants, 94.4% owned smartphones. Based on this data, the trends are evaluated, by categorizing usage into two types: (1) normal usage, and (2) usage for learning. Results indicate that majority of students in Saudi Arabia used smartphones as a regular mobile phone, as a computer with an internet connection, and as a digital camera. To study the trends in smartphone usage for learning, questions related to learning activities such as login to academic portal, use of blackboard, download class materials, taking and recording lecture notes using smartphones were asked. Research results indicate that 91.69% of students used smartphones to login to their academic portal. However, results also indicate that 60.89% of participants never used smartphones for blackboard, 66.01% students never used smartphones as a mean for taking notes in a classroom and 66.89% participants never used smartphones to record class lectures.

Satyrs (2013) focused on to measure the effects of smartphone use on stress, productivity, boredom, and loneliness. Results are measured with a survey containing Likert scales, hierarchical assessments, and open-ended response sections. Statistics are calculated using between-subjects, one-way analysis of variance (ANOVA), and

significant interactions are found for two of the hypotheses tested. Smartphone use is positively associated with increased stress, and negatively associated with increased boredom. Despite research design and circumstance flaws, relevant information and ideas relating to the use of smartphones and psychological well-being are thoroughly discussed.

Sang-Zo Nam (2013) surveyed how students of a university in South Korea use smartphones. Based on survey data from 135 participants, the most preferred usage and usual usages of the smartphone are evaluated. Perceived and relative significance of satisfaction to usages of the smartphone according to demographic variables such as gender and academic year have been evaluated. The results indicate that the most important usage of smartphone is 'real-time communication' rather than 'telephone' or 'internet search'. 'Study' usage gets the least response in usual usage and the most important usage of smartphone. 'Real-time communication' usage received the most affirmative response in serviceability too.

Karim *et al*. (2006) explored the utilization of mobile phone services in the educational environment, explore the nature of mobile phone use among university students and investigate the perception of university students on mobile phone uses in library and information services. The study describes the current status of wireless technology. It also identifies different wireless phone application for mobile phones which facilitate and enlarged the education.

Nowlan (2012) mentioned that with the increase of mobile technology availability and the demand for accessible mobile content, it is imperative that libraries examine how they can provide services to their patrons within this medium in order to continue to provide valuable services and make information retrieval easier for users. He stressed out that mobile technologies are constantly changing, so continuous assessment in this area is of importance. He determined how students at the University of Regina would like to interact with the library on their mobile devices and how to best construct a mobile site to suit the university community's information retrieval needs.

Bomhold (2013) described the usage of smartphone technologies, particularly mobile phone applications by the undergraduate university students. Finding of the research

showed that small percentage of most frequently used apps (10.4 percent), search engine, online encyclopedia and libraries were used by undergraduate students. The apps used most were familiar to them and allowed mobile access to popular with sites available on personal computers. Furthermore, a significant number (75 percent) of undergraduate students also reported that they use apps to find academic information. The type of apps most frequently used to find academic information is search engines.

Parsons (2010) investigated the current habits of distance learners in higher education (HR) regarding information retrieving and mobile devices use and their attitudes for future changes to their habits. It investigates the current habits and needs of distance learners regarding information provision by academics libraries, with reference to access using mobile devices. The research aimed is discover what information students access for their education and the various methods they use to obtain this information, with a focus on how they feel information access could be developed. Identifying what types of information students need to access and in what format they want them provided, alongside studying their current and desired use of mobile devices both for pleasure and education, supports decision-making on the potential of mobile devices within libraries service provision.

Suki & Suki (2007) discussed how the usage of mobile phones for m-learning differs between heavy and light mobile phone users. Heavy mobile phone users are hypothesized to have access to/subscribe to one type of mobile content than light mobile phone users, to have less frequent access to, subscribe to or purchase mobile content within the last year than light mobile phone users, and to pay less money for mobile learning, its content and mobile games than light mobile phone users Data were collected from 436 respondents. An analysis of variance (ANOVA) test was run to examine how the usage of mobile phone for m-learning differs between heavy and light mobile phone users in terms of access/subscription to several types of mobile content, frequency of access to, subscription to, and purchase of mobile content within the last year, and maximum amount of money paid for mobile learning, its content and mobile games. It was found that heavy mobile phone users access/subscribe to more than one type of mobile content than light mobile phone users, have more frequent access to, subscription to and purchase of mobile content

within the last year than light mobile phone users, and to spend more money on mobile learning, its content and mobile games than light mobile phone users.

Suki (2013) explored whether social needs, social influences and convenience of smartphones affects students' dependence on them. This research also examines whether students' dependence on smartphones influences their purchase behavior. This investigation is conducted among the students in a public university in the Federal Territory of Labuan, Malaysia. In total, 200 completed and usable questionnaires were received from the respondents who comprised students from a public university in the Federal Territory of Labuan, Malaysia. A simple random sampling method was utilized where every unit in the population had an equal chance to be selected. The research provides a unique perspective of students' dependence on smartphones, which is not much covered in the literature in the Malaysia context. The measurement produced can be used as a research tool for more exploratory and explanatory research regarding students' use of personal technologies such as smartphones and tablet PCs.

Nortcliffe & Middleton (2013) explored the hypothesis that students are being innovative in the ways in which they are using their smart devices to support their formal and informal learning. The study involved five students who own smart devices who were invited to discuss their ownership of smartphone and tablet technologies and the ways they used them in their studies. The students first completed a short questionnaire and were then interviewed in small groups. The results agree with previous research into student use of smart devices and describe autonomous engagement facilitated by personally owned smart technologies. The study identifies continuous patterns of pervasive engagement by students and concludes that more thought should be given to disruptive innovation, digital literacy and employability.

Clough *et al.* (2008) identified how enthusiastic student smartphone users deployed their devices to support their personal organization, indirectly improving their approach to study. Some of these students adapted the use of apps they already had installed to meet their learning needs rather than look for bespoke learning apps.
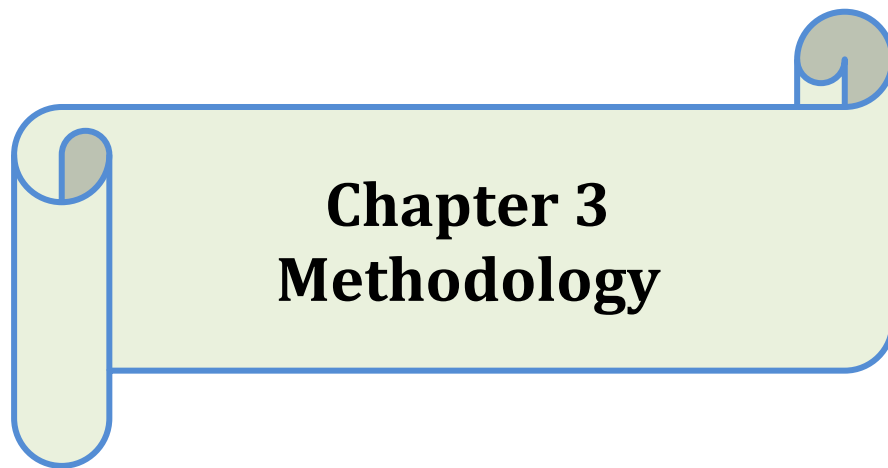
Genova (2010) stated that consumers have become highly dependent on smartphones which they can use when they commute, relax at home, travel overseas and so on. Consumers are perceived to be dependent on their smartphones when they view them as a necessity and have strong propensity for continuous high usage, being engaged and unwilling to part from them (Tian *et al.*, 2009). Thus, consumers' expectations for future purchase behavior will be affected by their past experience as they are heavily dependent on smartphones because of the underlying motives (Kuhlmeier and Knight, 2005). Suki and Suki (2007) found that heavy mobile phone users possess a higher level of knowledge, have more social participation, maintain extensive interpersonal networks and have contact with people not only within the social system but also outside it. This is supported by Peterson and Low (2011) who stated that student look at web sites, check their e-mail and use social networking sites such as Facebook and Twitter most often.

Jones and Heinrichs, (2012) conducted a study to investigate to which degree college students practice smartphone security. A survey of security-related practices was administered to students in business classes at a regional public university. Their results study indicated that students to be lax in their smartphone security with men more willing to engage in risky behaviors than women. Researchers also conducted a study to investigate a social impact of smartphone to the social relation and psychological well-being (Park and Lee. 2012). The study was conducted across several universities near the metropolitan areas in Korea. A total of 339 respondents participated in the survey, and data from 279 students were used for analysis (97 men and 182 women). All of the participants owned and used smartphones regularly. To examine the relationships between smartphone use and well-being, the study began by identifying the needs of a college student that are satisfied by a smartphone. Motives of smartphone use were determined by asking respondents how well each of the statements corresponded to their own motive of smartphone use (1 = not at all; 5 = exactly).The findings have shown a significant relation between supportive relationships and smartphone use for psychological well-being. Their findings also suggest that a smartphone can serve as a platform through which students can socialize with others, thus contributing to improving emotional and psychological.

Lee (2014) examined the factors that influence the adoption behavior of smartphone early adopters by looking at smartphone adoption behavior of college students. Their focus is on the effect of normative peer influence on a college student's smartphone adoption. They also examined the influence of other factors such as self-innovativeness, self-efficacy, the decision maker's attitudes towards a product, financial burden of using the product, familial influence, and other demographic factors (e.g., age and gender). College students' adoption behavior was studied based on random utility theory. The discrete choice models were used. Their findings showed that friends, financial burden and other family member are important influences on the adoption of smartphone among the college students.

In a recent thesis (2012), "Access to information through mobile phone in Dhaka city: A study on users' Perception and Satisfaction', the researcher attempted is to find out the determinants that are significantly influencing mobile phone users' perception in Bangladesh. The study surveyed 197 mobile phone users in Bangladesh from Dhaka city to determine the key influential factors that significantly influence on their perception and satisfaction. The results of the statistical analysis reflected that most of the mobile phone users are highly concerned about service quality followed by corporate image.

The review of literature reveals that some studies have done on mobile phone application and its usage in academic purposes. Some other works are also on smartphone application and its usage in access and academic purposes. Further there is an inadequate of literature on smartphone based education system. There the present study has made an attempt to explore the perception of the Dhaka University students about the accessing of information through smartphone. This study also made an attempt to indicate the positive and challenges for accessing information through smartphone for Dhaka University.

Chapter 3
Methodology

This research was exploratory studying nature. The use of smartphones for academic purposes was analyzed. This Chapter presents an overview of the methodology used in this research. The major areas covered include description of research methods, data collection and analysis.

3.1 Questionnaire Method

Questionnaire is one of the best methods of collecting original and primary data. The questionnaire was the main data collection instrument for the survey. Based on the literature review and to meet the objectives of the research, a structured questionnaire was designed to collect data from students at different faculties and institutes of the University of Dhaka. The questionnaire was made with simple, direct and familiar words keeping respondents general level of knowledge in mind. It was created to measure the importance of smartphone for academic purposes.

3.1.1 Why use Questionnaire Method

Questionnaire method helps to analyze and collect reliable, quantitative and primary data. It also provides opportunities to directly contact with the people from whom the information is collected. The questionnaire method also helps to understand the attitude and orientation of the research population (Aminuzzaman, 1991).

3.2 Study Area and Population

In simple language a population or universe can be defined as any collection of persons or objects or events in which one is interested (Gupta, 2005). Population is the complete set of items which are of interest in any particular situation (Gupta & Gupta, 2008). A population means only the people or documents etc., who are proposed to be covered under the scheme of study. Population can have sub-populations as well e.g., it can be male population or female population, literate or illiterate or rich or poor population and so on. Each sub-population is mutually exclusive segment or section (Raj, 1984). In a statistical investigation, the interest

usually lies in the assessment of the general magnitude and the study of variation with respect to one or more characteristics relating to individuals belonging to a group. This group of individuals under study is called population or universe. Thus in statistics, population is an aggregate of objects, animate or inanimate, under study (Gupta & Kapoor, 1994).

The study area of this research is Dhaka university campus. The participants of this study were undergraduate and postgraduate students of the University of Dhaka. They were from all academic faculties and institutes and from all academic years. Both male and female participants took part in this survey.

3.3 Sources of Data

3.3.1 Primary data or information:

A total of 333 questionnaires were distributed among students at different faculty and institutes of Dhaka University (a copy of the questionnaire is available in Appendix).

3.3.2 Secondary data or information

For secondary information, researcher has gone through different types of publications. Here the following published data are used:

     a.   Various publications of e-journals of Bangladesh and also other countries.
     b.   Various types of electronic resources which was related to the topic.

3.4 Designing the data collection tool

Depending upon the kind of data to be gathered, one should select an instrument for the purpose, provided the one exists (Kumar, 1999). Questionnaires are often used in surveys as the primary data collection instruments (Busha & Harter, 1980). A

questionnaire is a form containing a series of questions and providing space for their replies to be filled in by respondent himself (Reddy, 1987). The success of the questionnaire method of collecting information depends largely on the proper designing of the questionnaire (Gupta & Gupta, 2008). The language of the questionnaire should be clear and straightforward. Units of questions should be precisely stated or defined in order to ensure proper orientation of respondent. Long questions should be avoided. The questions should be so sequenced that the respondent is motivated and answer all questions. Complex questions that require the Respondent to go through several steps of reasoning before answering are undesirable and as such should be avoided (Raj, 1984).

The questionnaire for this study was designed to collect primary data about the concepts of smartphone from the target sample. The questionnaire was designed on the basis of the review of literature to meet the research objectives and find the answers to the research questions. It was tried to present the concepts of smartphone in simple and easily understandable form so that the respondents answer all the questions. The questionnaire consists of 22 questions which were segmented into three sections. The questions are pre-coded in nature. Most of the questions can hold multiple answers. The questionnaire consists of 3 sections:

Section A: Demographic and academic information such as department, gender, age and academic year etc.

Section B: Basic information about smartphone such as what brand of smartphone, how long use, what types of apps used on smartphone, what types of information they access through smartphone and how much important smartphone for academic purposes.

Section c: Students opinion on smartphone for information access. Students were asked to evaluate each questionnaire item from 1 – "lowest" to 7 – "highest".

3.5 Data Collection procedures:

Before doing the survey, a plan was made to conduct the survey. The sampling plan was divided into the following four steps:

Step 1: For the survey purpose, it has been planned to decide who is going to be the respondents for the survey. Identifying the correct respondents who can provide with accurate answer is very important for survey.

Step 2: Know about the information access through smartphone and the existing situations.

Step 3: In the third step, users of smartphone have been decided as the respondents of the survey.
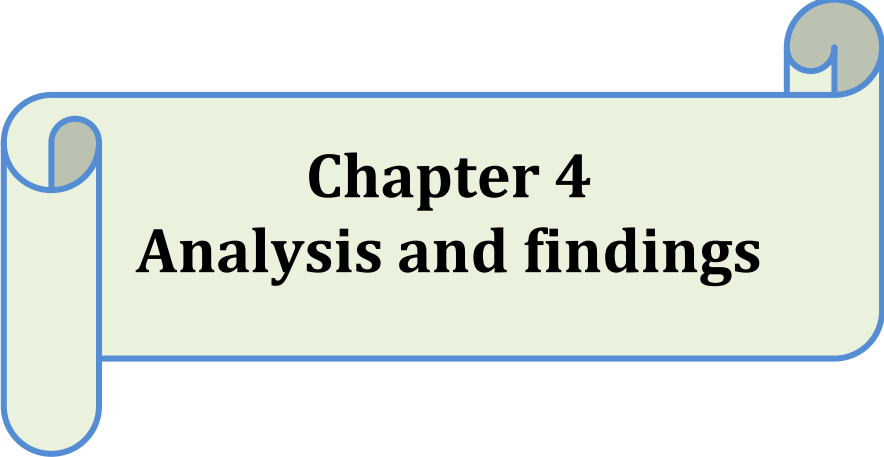
Step 4: Conduct survey through Questionnaire

3.6 Data Entry and Preparation for Analysis

After the completion of editing and coding, collected data will be entered using SPSS. The rearranging of data, collapsing of data, creating new variables, scaling of variables, recoding and necessary merging the categories with negligible frequency were conducted to prepare data for the final analysis.

3.7 Data processing and Analysis

One set of this study was duly edited to verify that the data recorded in the questionnaires have been carefully and accurately filled in. All the questionnaires were duly coded after editing for computer input. Questionnaire was analyzed using statistical software SPSS, and MS Excel. Descriptive statistics were used to analyze demographic characteristics of the students in relation to their smartphone use. The most common non-parametric statistical test for unrelated samples of scores is kruskal-Wallis test. This test is also used for similar research design as the independent t-test. In other words, it can be used on more than two groups of scores that are independent of each other.

Chapter 4
Analysis and findings

Analysis and Interpretation of data

To find the effects of smartphone on Dhaka University students, a questionnaire-based survey was made. The questionnaire consisted of 22 questions. All these questions were specifically prepared and closely related to the use of smartphones.

The collection of data was done at Dhaka University from 1 August to 10 September 2014. A total of 333 questionnaires were distributed among students of which 316 (response rate 98.89%) completed questionnaires were retrieved from them.

4.1 Respondents' faculty and institute by gender

As indicated earlier, 316 students participated in the survey. Among them, the largest group 110 (34.81%) was from the Faculty of Arts. The second largest group 58 (18.35%) came from the Business Studies faculty. The third largest response 49 (15.50%) was from the Faculty of Social sciences; followed by Faculty of Science 34 (10.76%) and Faculty of Biological Sciences 19 (6.02%). The lowest response came from various institutes 14 (4.43%) at Dhaka University.

Table 4.1 Respondents' faculty and Institute by gender

Faculty and institute	Male	%	Female	%	Total	%
Faculty of Arts	74	23.41	36	11.39	110	34.81
Faculty of Social Sciences	36	11.39	13	4.11	49	15.51
Faculty of Law	7	2.21	1	0.31	8	2.53
Faculty of Biological Sciences	18	5.69	1	0.31	19	6.02
Faculty of business	47	14.87	11	3.48	58	18.35
Faculty of Science	31	9.81	3	0.94	34	10.76
Faculty of Pharmacy	7	2.21	1	0.31	8	2.53
Faculty of Engineering and Technology	11	3.48	1	0.31	12	3.80
Faculty of Earth and Environmental Sciences	4	1.26	0	0	4	1.26
Institutes	11	3.47	3	0.94	14	4.43
Total	246	77.84	70	22.15	316	100
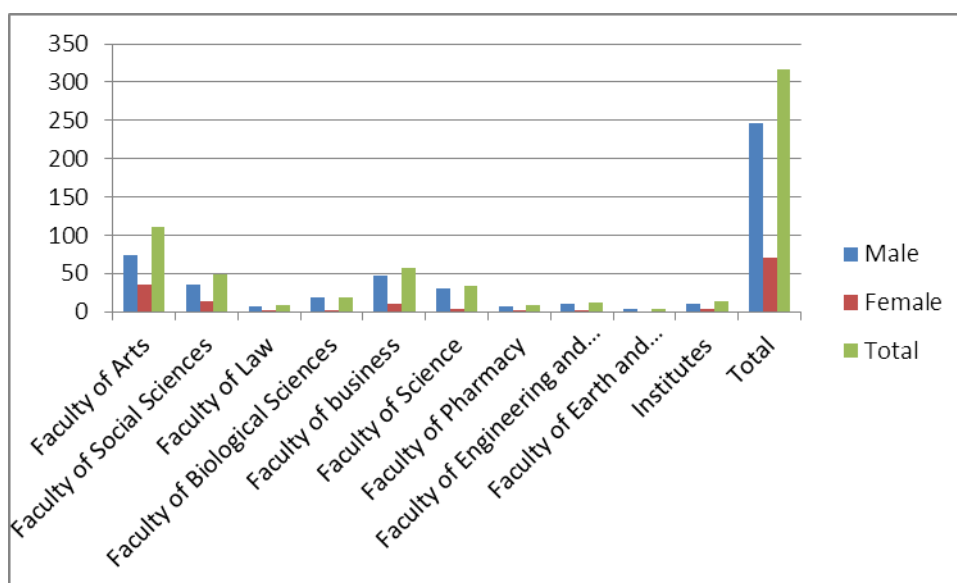
Figure 4.1 Respondents' faculty & Institute by gender

4.2 Respondents' status by gender

Among the participants, the majority of the students 173 (54.74%) were postgraduate students. The remaining 143 (45.25%) were undergraduate students.

Table 4.2 Respondents' Status by gender

Status	Male	%	Female	%	Total	%
Postgraduate	116	36.70	57	18.03	173	54.74
Undergraduate	130	41.13	13	4.11	143	45.25
Total	246	77.84	70	22.15	316	100
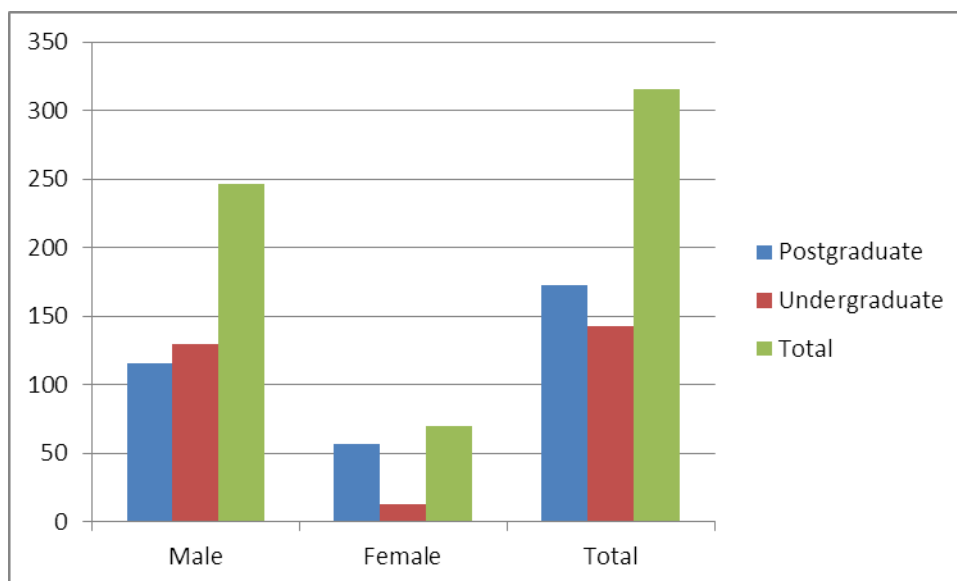
Figure4.2 Respondents' Status by gender

4.3 Respondents' age by gender

Among the students, the largest group was from 21-24 year age group. The number of students from 21-24 year age group was 221 (69.93%). Among them, 172 were (54.43%) male and 49 (15.50%) were female participants. The 2nd largest group (70, 22.15%) was from 17-20 year age group. Among them, 50 (15.82%) were male and 20 (6.32%) were female students. The remaining participants (25, 7.92%) were from 25-29 year age group.

Table 4.3 Respondents' age by gender

Age	Male	%	Female	%	Total	%
17-20 years	50	15.82	20	6.32	70	22.15
21-24 years	172	54.42	49	15.52	221	69.93
25-29 years	24	7.60	1	0.31	25	7.92
Total	246	77.84	70	22.15	316	100
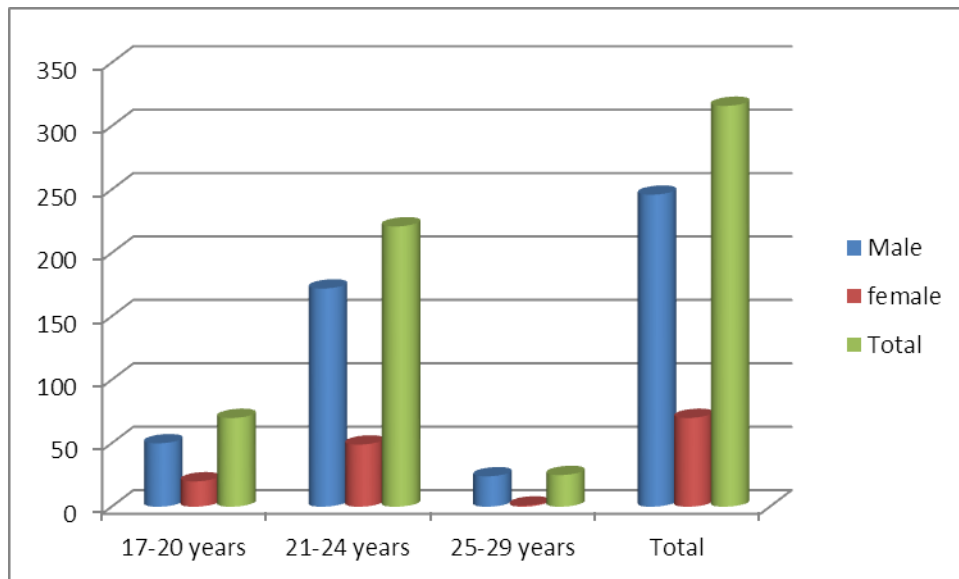
Figure 4.3 Respondents' age by gender

4.4 Respondents' place and origin by gender

The largest number of participants 175 (55.06%) came from rural areas. The 2nd largest group 73 (23.10%) was from small towns. The 3rd largest group 41 (12.97%). was from cities. The remaining participants 28 (8.86%) were from metropolitan cities.

Table 4.4 Respondents' place and origin by gender

Place of origin	Male	%	Female	%	Total	%
Rural area	153	48.41	21	6.64	174	55.06
Small town	49	15.50	24	7.59	73	23.10
City	22	6.96	19	6.01	41	12.97
Metropolitan city	22	6.96	6	1.89	28	8.86
Total	246	77.84	70	22.15	316	100
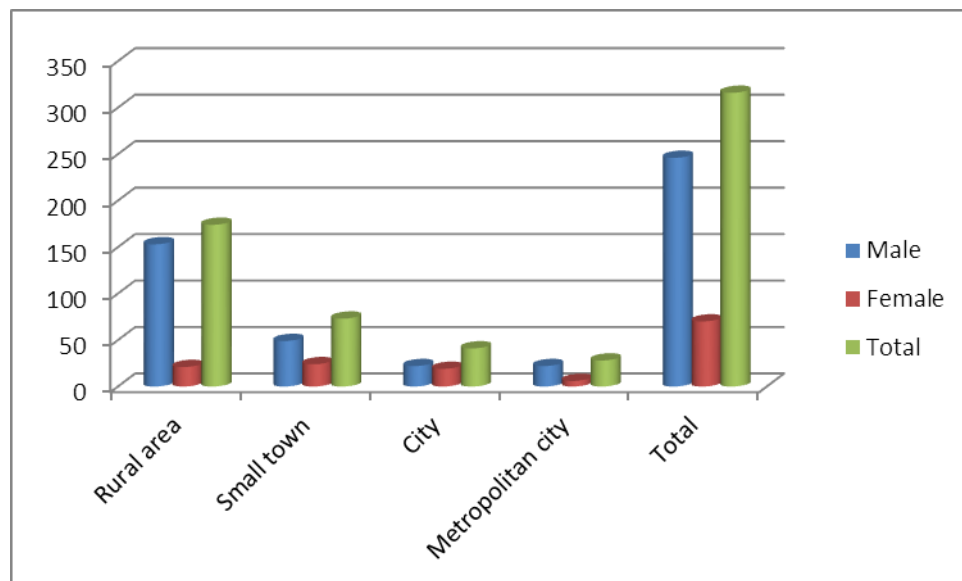
Figure 4.4 Respondents' place and origin by gender

4.5 Respondents' use of smartphone by gender

Among the participants, the largest group 90 (28.48%) had been using smartphones for 6 months-1 year. The 2nd largest group 87 (27.53%) was using smartphones for 1-2 year. The 3rd largest group of participants 83 (26.26%) was using smartphone for 1-6 months. The 4th largest group 32 (10.12%) was using smartphone for 2-3 years. The remaining students 24 (7.59%) had been using smartphones for more than 3 years.

Table 4.5 Respondents' use of smartphone by gender

Use of smartphone	Male	%	Female	%	Total	%
1-6 months	62	19.62	21	6.64	83	26.26
6 months to 1 year	67	21.20	23	7.27	90	28.48
1-2 years	71	22.46	16	5.06	87	27.53
2-3 years	27	8.54	5	1.58	32	10.12
more than 3 years	19	6.01	5	1.58	24	7.59
Total	246	77.84	70	22.15	316	100
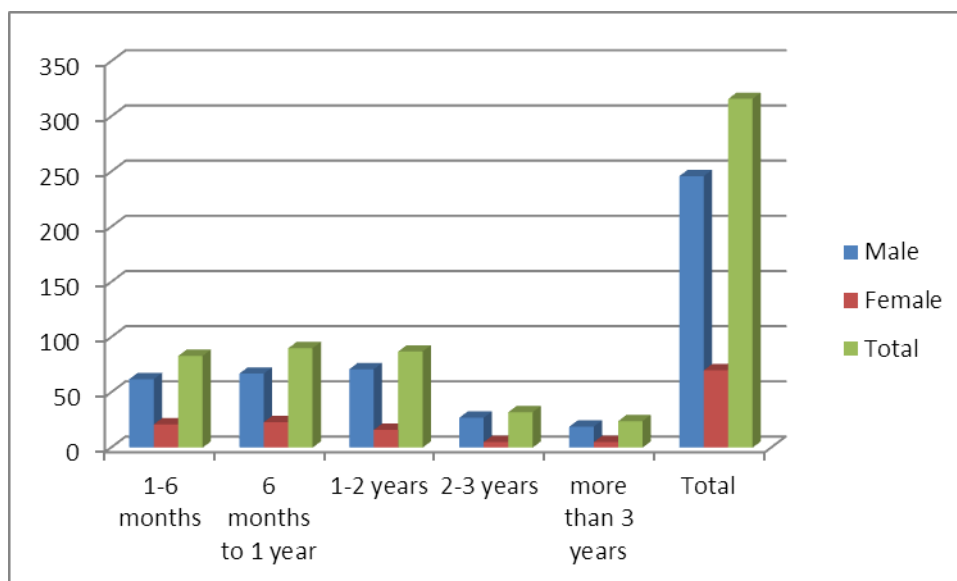
Figure 4.5 Respondents' use of smartphone by gen

4.6 Respondents' brand of smartphone by gender

Among the participants, the largest group 83 (26.26%) used Symphony phones. The 2nd largest group 73(23.10%) used Samsung mobiles. The 3rd largest group 65 (20.56%) used Nokia and Walton each. The data indicates that only a few students (6, 1.89%) used Apple phones.

Table 4.6 Respondents' brand of smartphones by gender

Brand of smartphone	Male	%	Female	%	Total	%
Nokia	49	15.50	16	5.06	65	20.56
Samsung	56	17.72	17	5.37	73	23.10
Walton	49	15.50	16	5.06	65	20.56
Apple	6	1.89	0	0	6	1.89
Symphony	67	21.20	16	5.06	83	26.26
Others	19	6.01	5	1.58	24	7.59
Total	246	77.84	70	22.15	316	100
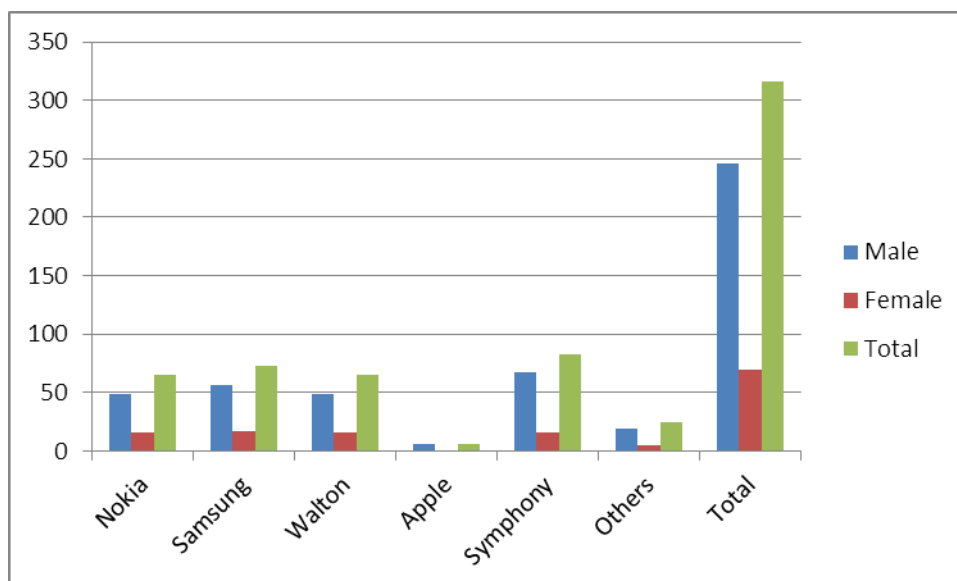
Figure 4.6 Respondents' brand of smartphones by gender

4.7 Respondents' use of mobile network:

Among 316 participants, the largest group used 183 (37.1%) GP network. The 2nd largest group used Banglalink 130 (26.4%); followed by Airtel 80 (16.2%), Robi 58 (11.8%), Teletalk 31 (6.3%), and Citycell 10 (2.0%). It seems many students used multiple networks in their sets.

Table 4.7 Respondents' use of mobile network

Network	Count	%
GP	183	37.1
Banglalink	130	26.4
City cell	10	2.0
Airtel	80	16.2
Robi	58	11.8
Teletalk	31	6.3
Others	1	.2
	493	100
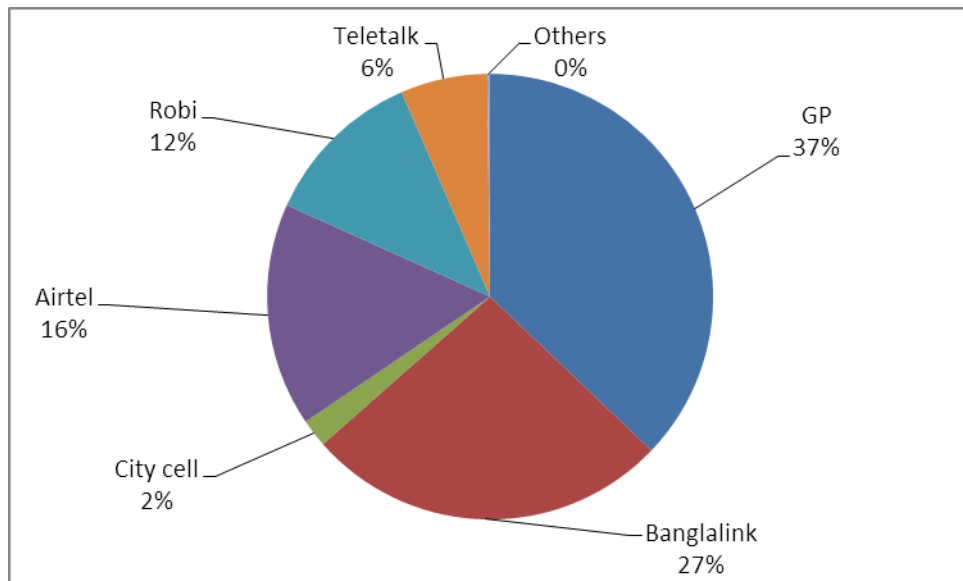
Figure 4.7 Respondents' use of network

4.8 Respondents' use of internet by gender:

Among 316 participants, all of them used internet through their smartphones.

Table 4.8 Respondents' mode of use of internet by gender

Use internet on smartphone	Male	%	Female	%	Total	%
Yes	246	77.84%	70	22.15%	316	100

4.9 Respondents' mode of access to internet by gender:

Among the participants, the largest group 217 (68.67%) accessed internet both through mobile network and Wi-Fi. The 2nd largest group 53 (16.77%) used only Wi-Fi for accessing internet. The remaining students 46 (14.55%) accessed internet only through mobile network.

Table 4.9 Respondents' mode of access to internet by gender

Access internet through	Male	%	Female	%	Total	%
Mobile network	36	11.39	10	3.16	46	14.55
Wi-Fi	42	13.29	11	3.48	53	16.77
Both	168	53.16	49	15.50	217	68.67
Total	246	77.84	70	22.15	316	100
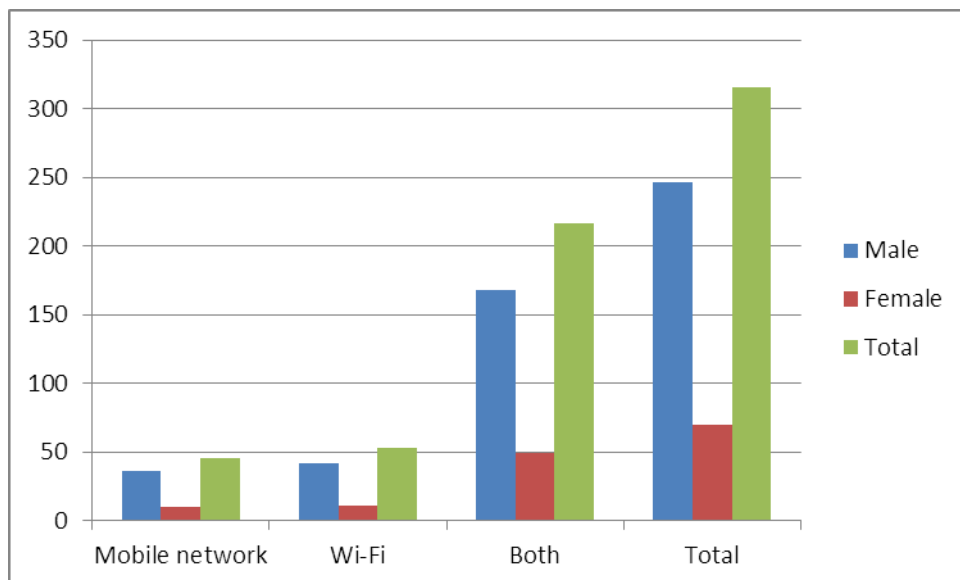
Figure 4.9 Respondents' access of internet by gender

4.10 Respondents' use of smartphones as modem by gender:

Among 316 participants, most respondents 190 (60.12%) indicated that they used their smartphones as an alternative to modem of which 142 (44.93%) were male and the remaining 48 (15.18%) were female students.

Table 4.10 Respondents' alternative use of smartphones as modem by gender

Alternative use as modem	Male	%	Female	%	Total	%
Yes	142	44.93	48	15.18	190	60.12
No	104	32.91	22	6.96	126	39.87
Total	246	77.84	70	22.15	316	100
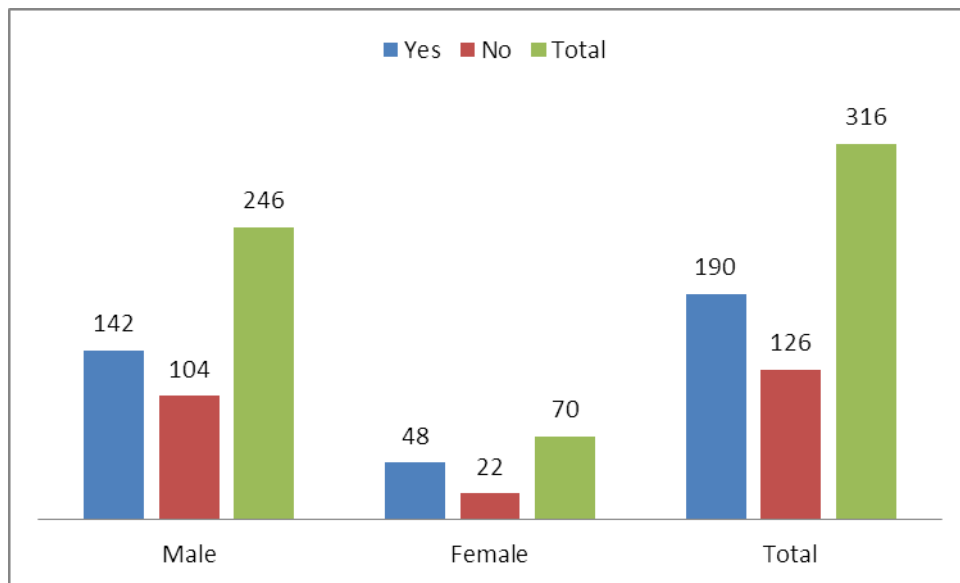
Figure 4.10 Respondents' alternative use as modem by gender

4.11 Respondents' frequency of internet access via smartphone by gender

Among the participants, the largest group 197 (62.34%) accessed internet few times every day. The 2nd largest group 70 (22.15%) used internet at least once a day. The 3rd largest group 25 (7.91%) accessed internet few times a week; followed by at least once a week 13 (4.11%) and at least once a month 9 (2.84%).

Table 4.11 Respondents' frequency of accessing internet via smartphone by gender

Frequency of access	Male	%	Female	%	Total	%
Few times everyday	164	51.89	33	10.44	197	62.34
At least once a day	47	14.87	23	7.27	70	22.15
Few times a week	20	6.32	5	1.58	25	7.91
At least once a week	7	2.21	6	1.89	13	4.11
At least once a month	7	2.21	2	0.63	9	2.84
Others	1	0.31	1	0.31	2	0.63
Total	246	77.8	70	22.15	316	100
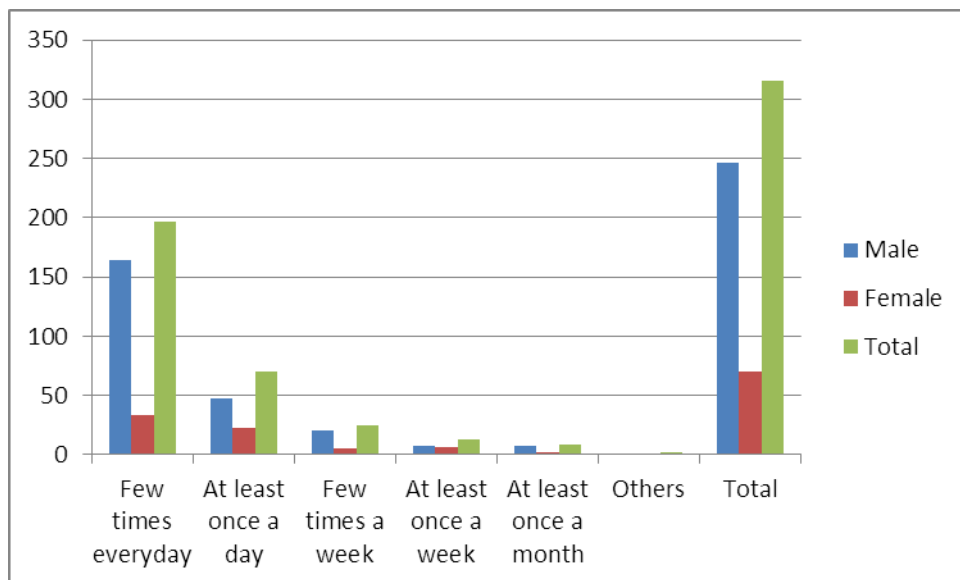
Figure4.11 Respondents' frequency of accessing internet via smartphone by gender

4.12 Respondents' using search engine by gender:

Among the participants, the largest group 203 (64.24%) used Google as their popular search engine. The 2nd largest group used 97 (30.69%) Opera; followed by Yahoo! 10 (3.16%) and Ask Jeeves 2 (0.63%). The remaining students 4 (1.26%) used other search engines for accessing the internet.

Table 4.12 Respondents' popular search engines by gender

Search engines used	Male	%	Female	%	Total	%
Google	162	51.26	41	12.97	203	64.24
Opera	73	23.10	24	7.59	97	30.69
Ask Jeeves	0	0	2	0.63	2	0.63
Yahoo!	7	2.21	3	0.94	10	3.16
Others	4	1.26	0	0	4	1.26
Total	246	77.84	70	22.15	316	100
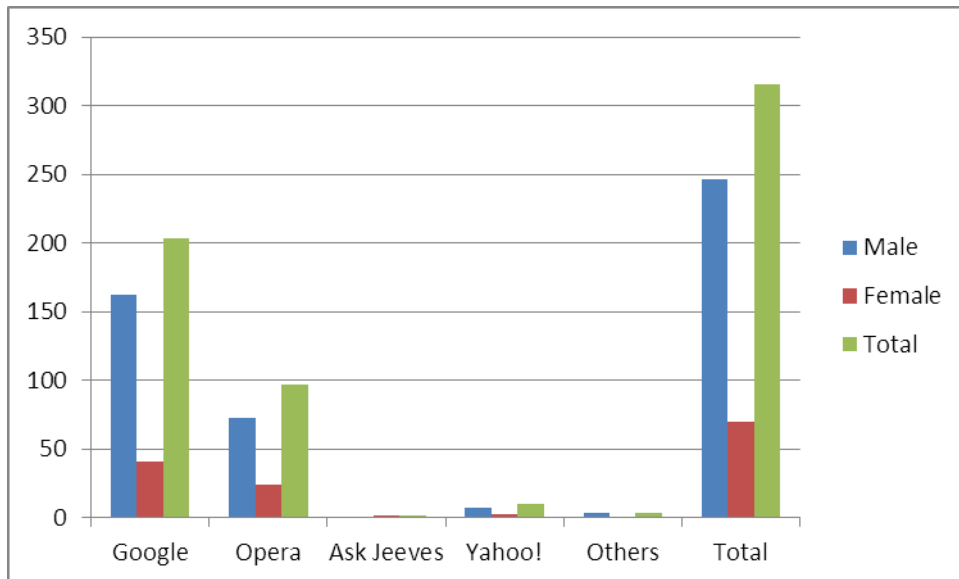
Figure4.12 Respondents' use of search engines by gender

4.13 Respondents' access to information via smartphone by gender

Among the participants, the largest group 207 (21.2%) used smartphones for academic purposes. The 2nd largest group 200 (20.5%) made use of smartphones to read news. The 3rd largest group 190 (19.5%) used smartphones for accessing social media sites; followed by sports information 129 (13.2%); entertainment 120 (12.3%), and listen to music 119 (12.2%).

Table 4.13 Respondents' use of smartphone by gender

Types of information use	Frequency count	%
Academic	207	21.2
Sports	129	13.2
News	200	20.5
Music	119	12.2
Social media	190	19.5
Entertainment	120	12.3
Others	11	1.1
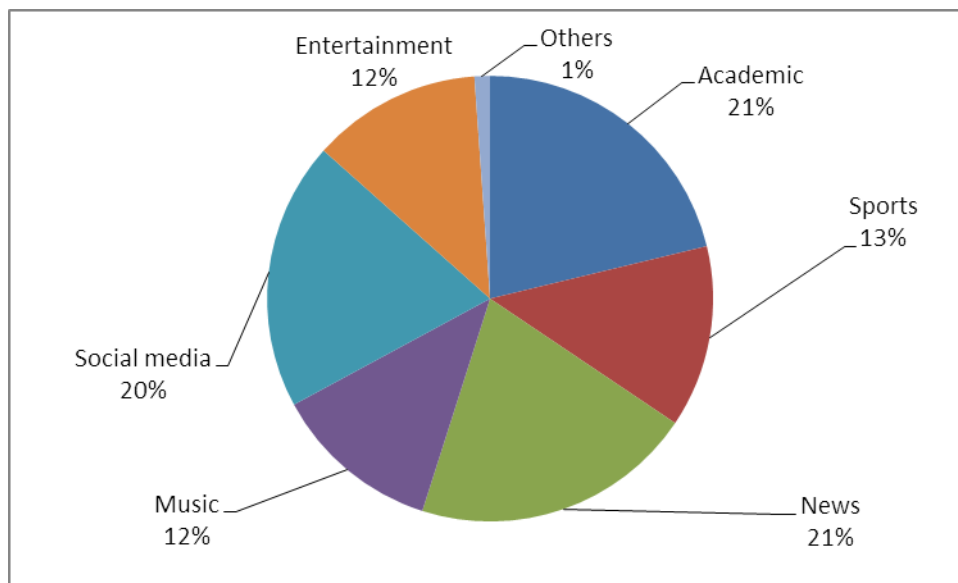
Figure 4.13 Respondents' access to information via smartphone by gender

4.14 Respondents' access to information via smartphone for academic purposes by gender

When asked what type of academic information students seek via their smartphones, the largest group 155 (23.7%) stated that they read online articles. The 2nd largest group 153 (23.4%) read text books; followed by watching videos 117 (17.9%),

recording class notes 94 (14.4%), preparing class note 75 (11.5%) and look for library reference 48 (7.4%). The remaining students 11 (1.7%) gathered other academic information through their smartphones.

Table 4.14 Respondents' access to information via smartphone for academic purposes by gender

Types of data	Count	%
Reading article	155	23.7
Recording class note	94	14.4
Reading text book	153	23.4
Preparing class note	75	11.5
Learning video	117	17.9
Library reference	48	7.4
Others	11	1.7
Total	653	100
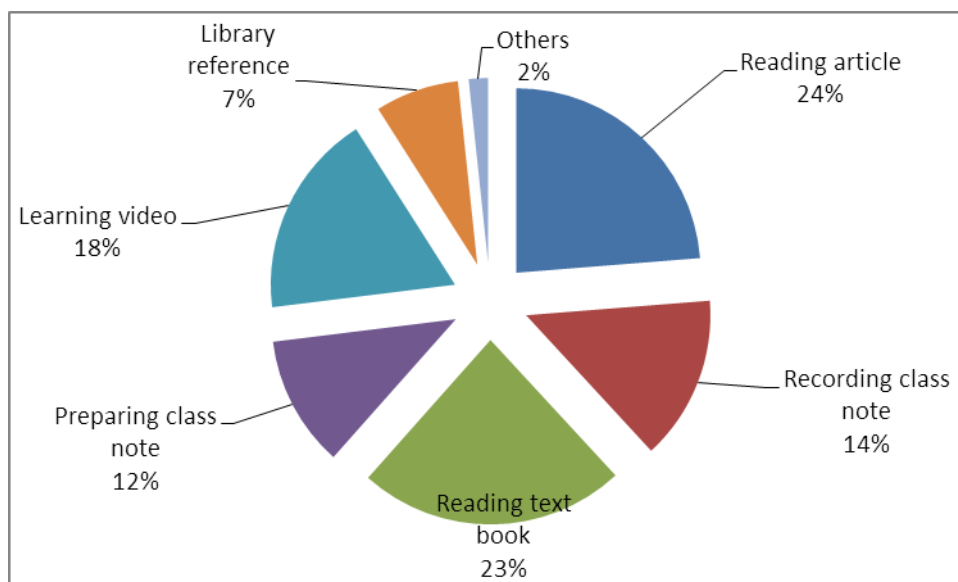
Figure 4.14 Respondents' access to information via smartphone

For academic purposes by gender

4.15 Respondents' frequently access of data for academic purposes by gender

When asked how frequently they access of data for academic purposes via their smartphones, the largest group 146 (46.20%) stated that they used smartphone few times every day. The 2nd largest group 54 (17.08%) used smartphone at least once a day for academic information; followed by few times a week 53 (16.77%), at least once a week 36 (11.39%), and at least once a month 21 (6.64%).

Table 4.15 Respondents' frequency of accessing academic

information by gender

Frequency of smartphone use for academic information	Male	%	Female	%	Total	%
Few times every day	123	38.92	23	7.27	146	46.20
At least once a day	39	12.34	15	4.74	54	17.08
Few times a week	38	12.02	15	4.74	53	16.77
At least once a week	23	7.27	13	4.11	36	11.39
At least once a month	18	5.6	3	0.94	21	6.64
Others	5	1.58	1	0.31	6	1.89
Total	246	77.84	70	22.15	316	100
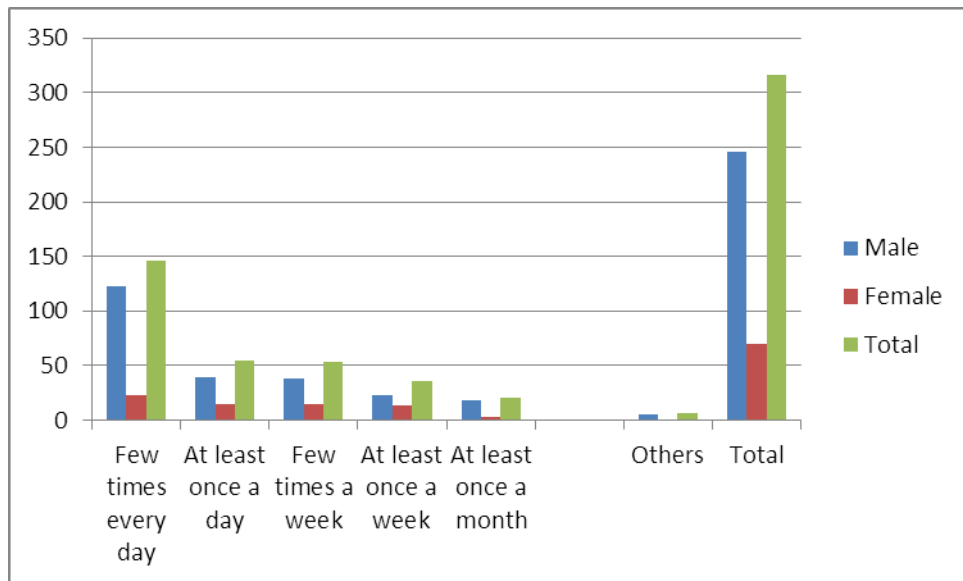
Figure 4.15 Respondents' frequency of accessing academic information by gender

4.16 Respondents' opinion on importance of smartphones for academic purposes by gender

Among the participants, the largest group 125 (39.55%) stated that smartphones are important for academic purposes. The 2nd largest group 84 (26.58%) thought that smartphones are moderately important for academic purposes. The third largest group 80 (25.31%) indicated that it is extremely important for them to access academic information through their smartphones. Only a few students felt that it is either not very important 24 (7.59%) or not at all important1 (1.89%) to use smartphones for academic purposes. Two students (0.64%) were unsure about academic use of smartphones.

Table 4.16 Respondents' opinion on importance of smartphones for academic purposes by gender

Important of smartphone for academic purposes	Male	%	Female	%	Total	%
Extremely important	69	21.83	11	3.48	80	25.31
Important	91	28.79	34	10.75	125	39.55
Moderately important	64	20.25	20	6.32	84	26.58
Not very important	21	6.64	3	0.94	24	7.59
Not at all important	0	0	1	0.31	1	0.31
Do not know	1	0.31	1	0.31	2	0.63
Total	246	77.84	70	22.15	316	100
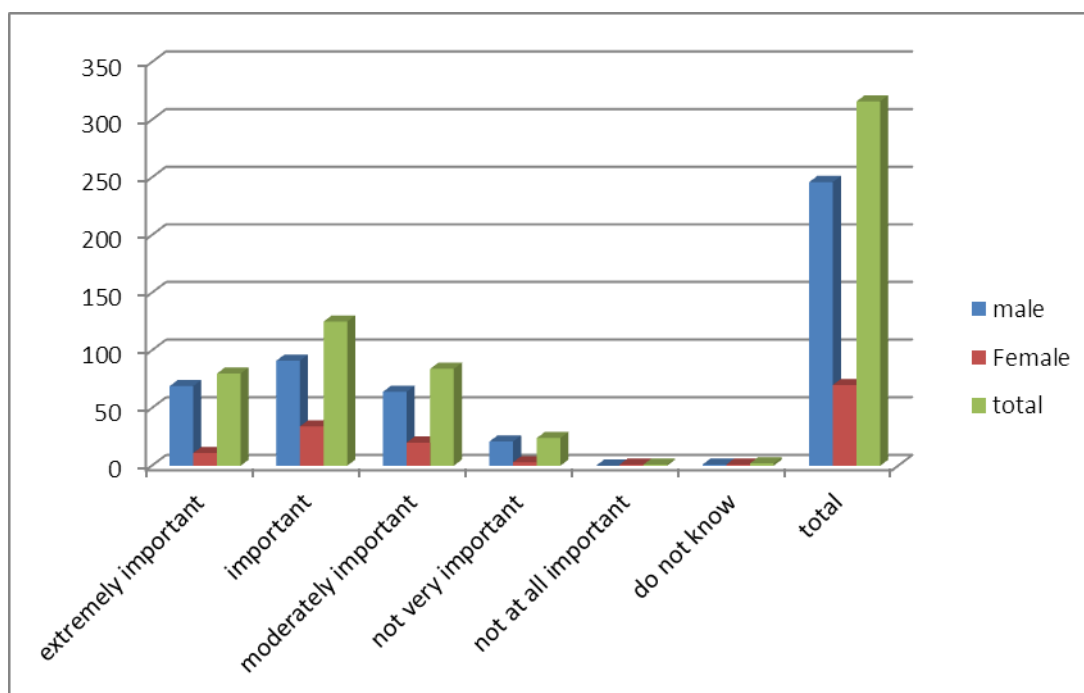
Figure 4.16 Respondents' opinion on importance of smartphones for academic purposes by gender

4.17 Respondents' use of apps on smartphone by gender

Among the participants, the majority of the students 191 (60.44%) used apps on their smartphones. The remaining 125 (39.55%), did not used apps on their smartphone.

Table 4.17 Respondents' use of apps on smartphone by gender

Use apps on smartphone	Male	%	Female	%	Total	%
Yes	158	50.00	33	10.44	191	60.44
No	88	27.84	37	11.70	125	39.55
Total	246	77.84	70	22.15	316	100
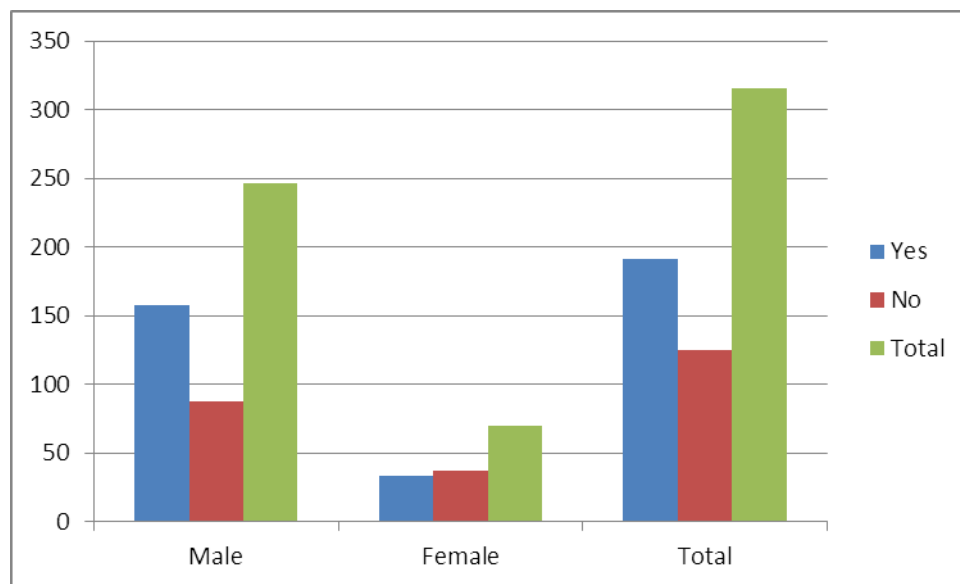
Figure 4.17 Respondents' use off apps on smartphone by gender

4.18 Respondents' interest in downloading apps on smartphone by gender

Among the participants, the majority 283 (89.55%) seem interested in downloading apps on their smartphones. The remaining 33 (10.44%) were not interested in downloading apps on their smartphones.

Table 4.18 Respondents' interest in downloading apps on their smartphones by gender

Interested in download apps	Male	%	Female	%	Total	%
Yes	224	70.88	59	18.67	283	89.55
No	22	6.96	11	3.48	33	10.44
Total	246	77.84	70	22.15	316	100
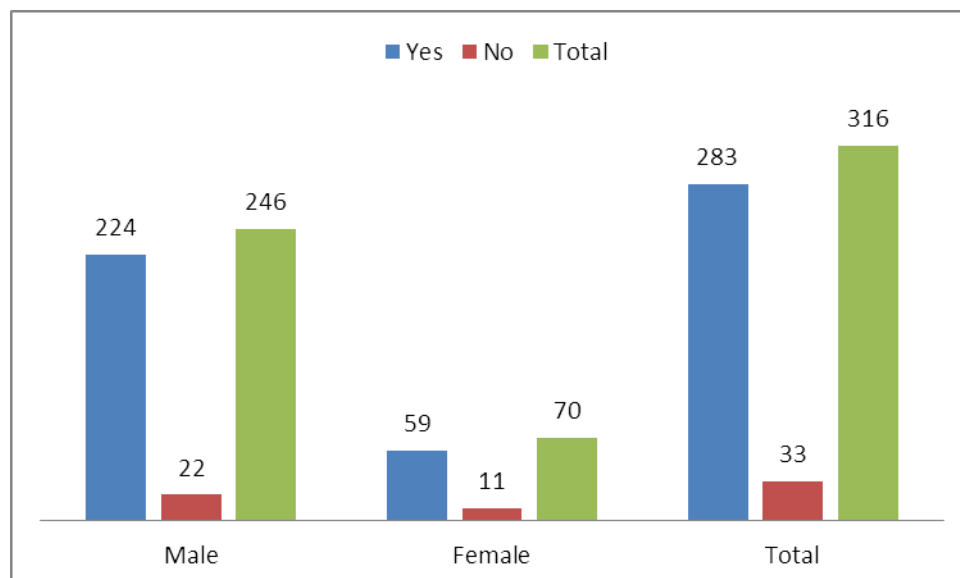
Figure 4.18 Respondents' interest in downloading apps on smartphones by gender

4.19 Respondents' opinion: smartphone could facilitate learning by status

Among the participant, the majority of the students 306 (96.83%) felt that smartphone could facilitate learning. The remaining 10 (3.16%) thought that smartphone could not facilitate learning.

Table 4.19 Respondents' opinion: smartphone could facilitate learning by status

Facilitate learning	Graduate	%	Undergraduate	%	Total	%
Yes	165	52.21	141	44.62	306	96.83
No	8	2.53	2	0.63	10	3.16
Total	173	54.74	143	45.25	316	100
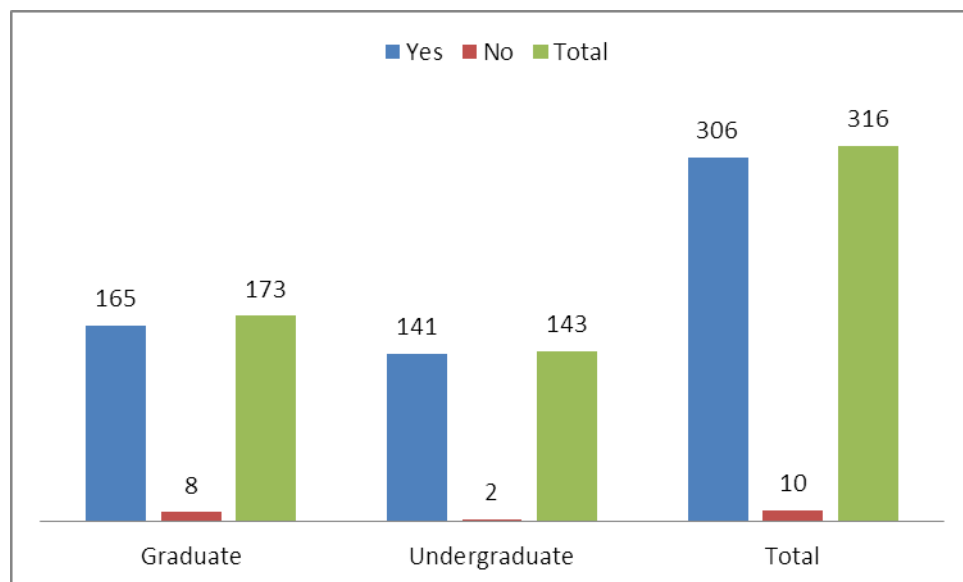
Figure 4.19 Respondents' opinion: smartphone could facilitate learning by status

4.20 Respondents' opinion: smartphone could save time and increase productivity by status

Among the participant, the majority of the students 288 (91.13%) thought that smartphone could save time and increase productivity. Only 28 (8.86%) students felt that smartphone could not save time and increase productivity.

Table 4.20 Respondents' opinion: smartphone could save time and increase productivity by status

Save time and increase productivity	Graduate	%	under graduate	%	Total	%
Yes	157	49.68	131	41.45	288	91.13
No	16	5.06	12	3.79	28	8.86
Total	173	54.74	143	45.25	316	100
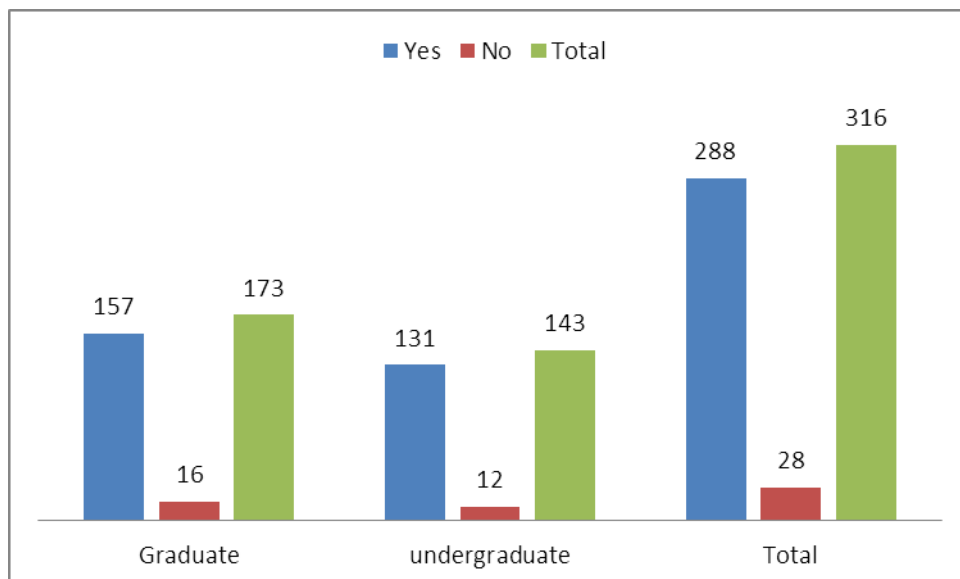
Figure 4.20 Respondents' opinion: smartphone could save time and increase productivity by status

4.21 Respondents' opinion: smartphone could help skill development and training by status

Among the participant, the majority of the students 288 (91.13%) stated that smartphone could help skill development and training. The remaining 28 (8.86%) thought that smartphone could not help skill development and training.

Table 4.21 Respondents' opinion: smartphone could help skill development and training by status

Help skill development and training	Graduate	%	Under graduate	%	Total	%
Yes	155	49.05	133	42.08	288	91.13
No	18	5.69	10	3.16	28	8.86
Total	173	54.74	143	45.25	316	100
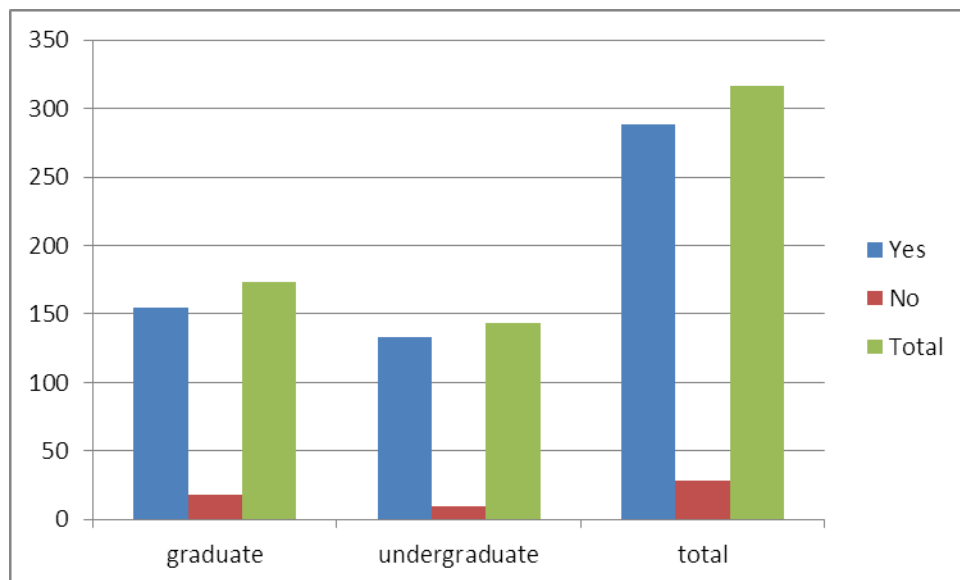
Figure 4.21 Respondents' opinion: smartphone could help skill development and training by status

4.22 Respondents' opinion: smartphone could help find up-to-date information by status

Among the participant, most of the students 310 (98.10%) thought that smartphone could find up-to-date information. The remaining 6 (1.90%) students assumed that smartphone could not find up-to-date information.

Table 4.22 Respondents' opinion: smartphone could help find up-to-date information by status

Finding up-to-date information	Graduate	%	Under graduate	%	Total	%
Yes	171	55.10	139	44.00	310	98.10
No	2	.60	4	1.30	6	1.90
Total	173	55.70	143	45.30	316	100
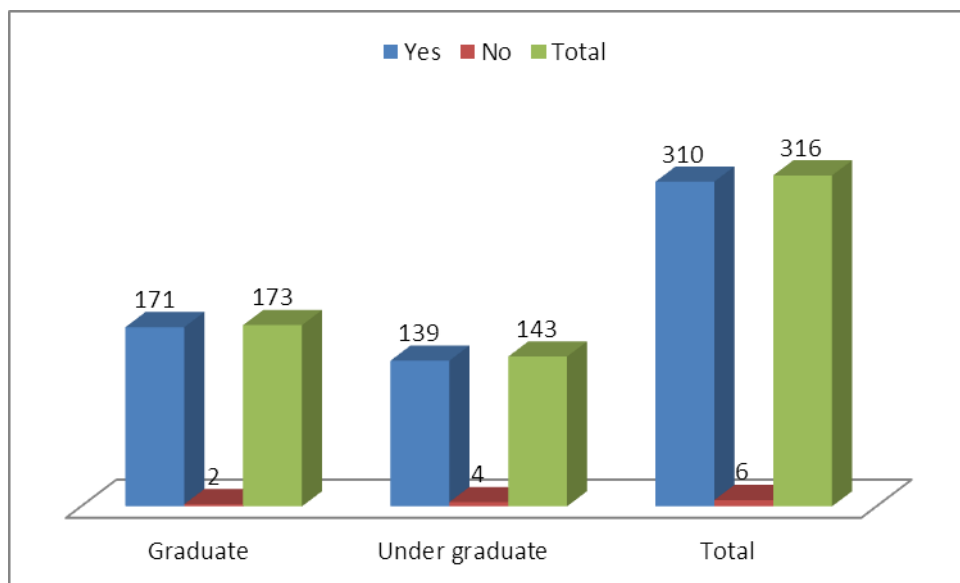
Figure 4.22 Respondents' opinion: smartphone could help find up-to-date information by status

Table 4.23 University of Dhaka: participating students [N=316], by opinion (on a 7-point scale)

Student opinion	Mean	Standard deviation
Easy to search for relevant information	4.75	1.67
Improve study skill	4.54	1.54
Easy to access	4.51	1.50
Easy to participate in class related discussion	4.45	1.59
Increase knowledge	4.70	1.46
Increase motivation	4.36	1.62
Overall academic quality	4.69	1.50
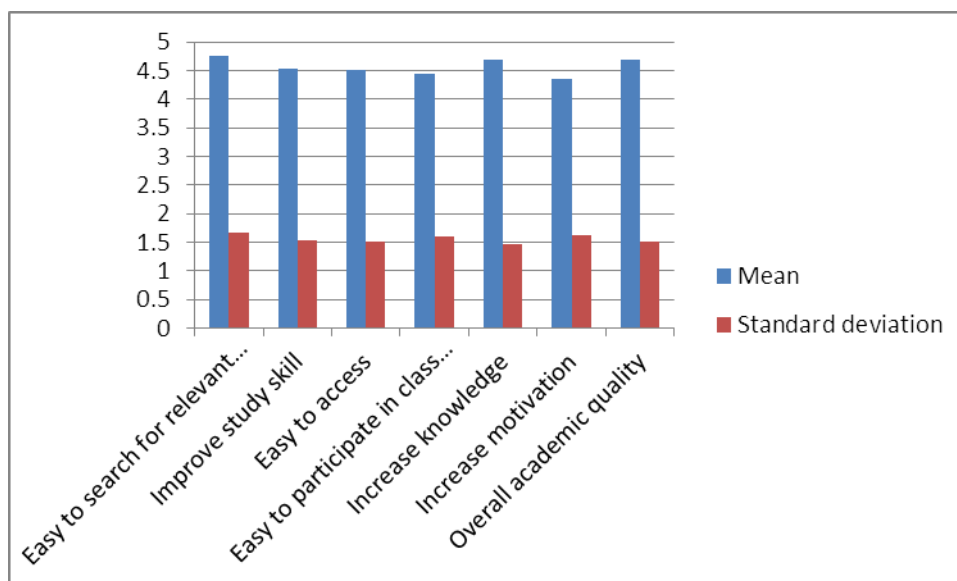
Figure 4.23 University of Dhaka: participating students [N=316], by opinion

Hypotheses

In order to determine the influence of students' demographic and individual characteristics on their opinion on using smartphone for information access, the following null hypotheses are tested:

H1   There is no significant difference between male and female students in terms of their opinions on using smartphone for information access;

H2   There is no significant difference among various age groups in terms of their opinions on using smartphone for information access;

H3   There is no significant difference among students from various graduate and undergraduate in terms of their opinions on using smartphone for information access;

H4   There is no significant difference among students from different places of origin in terms of their opinions on using smartphone for information access; and

H5   There is no significant difference among students with different levels of computer knowledge in terms of their opinions on using smartphone for information access.

Table 4.24 University of Dhaka: participating students [N=316], Mann-Whitney

test for opinion on using smartphone for information access by gender

	Gender of partici pant	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxo n W	z	Asym p. Sig. (2-tailed)
Easy to search for relevant information	Male	246	166.45	40945.50	6655.500	9140.500	-2.947	.003*
	Female	70	130.58	9140.50				
Improve study	Male	246	164.98	40584.00	7017.000	9502.000	-2.410	.016*
	Female	70	135.74	9502.00				
Easy to access	Male	246	163.65	40257.00	7344.000	9829.000	-1.913	.056*
	Female	70	140.41	9829.00				
Easy to participate in class related discussion	Male	246	164.57	40484.00	7117.000	9602.000	-2.255	.024*
	Female	7o	137.17	9602.00				
Increase knowledge	Male	246	166.08	40856.00	6745.000	9230.000	-2.824	.005*
	Female	70	131.86	9230.00				
Increase motivation	Male	246	164.46	40457.50	7143.500	9628.500	-2.211	.027*
	Female	70	137.55	9628.50				
Overall academic quality	Male	246	164.34	40426.50	7174.500	9659.500	-2.176	.030*
	Female	70	137.99	9659.50				

Note: *significant at p < 0.05

Table 4.25 shows the results of Mann-Whitney test for differences between male and female students' opinions on using smartphone for information access. There were significant differences in all out of seven scores. Thus, the null hypothesis is rejected. The mean rank for female students was low in all cases suggesting they were unsure about the benefits of using s smartphone in education.

Table 4.25 University of Dhaka: participating students [N=316], Kruskal-Wallis test for opinions on using smartphone for information access by age

	Age of participant	N	Mean Rank	Chi-Square	df	Asymp. Sig.
Easy to search for relevant information	17-20 years 21-24 years 25-29 years	70 221 25	148.85 158.22 187.96	3.499	2	.174
Improve study	17-20 years 21-24 years 25-29 years	70 221 25	151.51 156.00 200.20	6.020	2	.049*
Easy to access	17-20 years 21-24 years 25-29 years	70 221 25	167.42 151.37 196.56	6.600	2	.037*
Easy to participate in class related discussion	17-20 years 21-24 years 25-29 years	70 221 25	167.42 151.37 196.56	2.394	2	.302
Increase knowledge	17-20 years 21-24 years 25-29 years	70 221 25	146.34 157.56 200.84	6.916	2	.031*
Increase motivation	17-20 years 21-24 years 25-29 years	70 221 25	155.72 154.49 201.70	6.283	2	.043*
Overall academic quality	17-20 years 21-24 years 25-29 years	70 221 25	159.80 154.42 200.84	3.765	2	152

Note: *significant at p < 0.05

Table 4.26 reveals the results of Kruskal-Wallis test for differences among age groups in terms of their opinions on using smartphone for information access. There were no significant differences in three out of seven scores. Thus, the null hypothesis is accepted for three items but rejected for four items.

Table 4.26 University of Dhaka: participating students [N=316], Mann-Whitney test for opinions on using smartphone for information access by status

	Status of participant	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	z	Asymp. Sig. (2-tailed)
Easy to search for relevant information	Undergraduate	173	158.12	27354.00	12303.000	27354.000	-.084	.933
	Postgraduate	143	158.97	22732.00				
Improve study	Undergraduate	173	153.86	26617.50	11566.500	26617.500	-1.013	.311
	Postgraduate	143	164.12	23468.50				
Easy to access	Undergraduate	173	155.21	26851.00	11800.000	26851.000	-.718	.473
	Postgraduate	143	162.48	23235.00				
Easy to participate in class related discussion	Undergraduate	173	156.64	27099.50	12048.500	27099.500	-.405	.686
	Postgraduate	143	160.74	22986.50				
Increase knowledge	Undergraduate	173	152.86	26445.00	11394.000	26445.000	-1.232	.218
	Postgraduate	143	165.32	23641.00				
Increase motivation	Undergraduate	173	154.92	26801.50	11750.500	26801.500	-.778	.436
	Postgraduate	143	162.83	23284.50				
Overall academic quality	Undergraduate	173	154.16	26669.00	11618.000	26669.000	-.950	.342
	Postgraduate	143	163.76	23417.00				

Note: *significant at p < 0.05

Table 4.26 shows the results of Mann-Whitney test for differences between undergraduate and graduate students' opinion on using smartphone for information access. There were no significant differences in all of these seven scores; thus the null hypothesis is accepted.

Table 4.27 University of Dhaka: participating students [N=316], Kruskal–Wallis test for opinions on using smartphone for information access by origin

	Place of origin of participant	N	Mean Rank	Chi-Square	df	Asymp. Sig.
Easy to search for relevant information	rural area	174	161.88	8.157	3	.043*
	small town	73	134.49			
	city	41	170.83			
	metropolitan city	28	182.05			
Improve study	rural area	174	164.54	8.926	3	.030*
	small town	73	133.71			
	city	41	158.57			
	metropolitan city	28	185.48			
Easy to access	rural area	174	164.55	4.561	3	.207
	small town	73	142.88			
	city	41	148.71			
	metropolitan city	28	175.96			
Easy to participate in class related discussion	rural area	174	159.53	9.621	3	.022*
	small town	73	142.40			
	city	41	152.10			
	metropolitan city	28	203.45			
Increase knowledge	rural area	174	172.72	17.561	3	.001*
	small town	73	129.19			
	city	41	133.49			
	metropolitan city	28	183.14			
Increase motivation	rural area	174	165.41	8.494	3	.037*
	small town	73	138.82			
	city	41	144.32			
	metropolitan city	28	187.64			
Overall academic quality	rural area	174	165.94	5.992	3	.112
	small town	73	141.38			
	city	41	144.96			
	metropolitan city	28	176.73			

Note: *significant at p < 0.05

Table 4.27 illustrates the K-W test results for differences in the opinions of students from different places of origin on using smartphone for information access. The results suggest that there were significant differences in five out of seven cases.

Table 4.28 University of Dhaka: participating students [N=316], Kruskal-Wallis test for opinions on using smartphone for information access by years of use

	Use of smartphone	N	Mean Rank	Chi-Square	df	Asymp. Sig.
Easy to search for relevant information	1-6 months 6 months to 1 year 1-2 years 2-3 years more than 3 years	83 90 87 32 24	154.48 160.22 138.46 202.39 180.08	13.554	4	.009*
Improve study	1-6 months 6 months to 1 year 1-2 years 2-3 years more than 3 years	83 90 87 32 24	146.16 159.63 151.73 192.38 176.31	7.615	4	.107
Easy to access	1-6 months 6 months to 1 year 1-2 years 2-3 years more than 3 years	83 90 87 32 24	158.81 163.19 144.61 167.14 178.67	3.849	4	.427
Easy to participate in class related discussion	1-6 months 6 months to 1 year 1-2 years 2-3 years more than 3 years	83 90 87 32 24	159.54 158.18 148.17 166.52 182.83	3.189	4	.527
Increase knowledge	1-6 months 6 months to 1 year 1-2 years 2-3 years more than 3 years	83 90 87 32 24	149.89 159.11 152.63 168.89 193.46	5.245	4	.263
Increase motivation	1-6 months 6 months to 1 year 1-2 years 2-3 years more than 3 years	83 90 87 32 24	168.16 153.03 150.68 156.73 176.27	2.901	4	.574
Overall academic quality	1-6 months 6 months to 1 year 1-2 years 2-3 years more than 3 years	83 90 87 32 24	155.37 152.79 152.98 167.61 198.58	5.961	4	.202

Note: *significant at p < 0.05

Table 4.28 illustrates the K-W test results for differences in the opinions of students from use of duration on using smartphone for information access. There were no significant differences in six out of seven scores. Thus, the null hypothesis is accepted for six items but rejected one items.

Chapter 5
Conclusion and Recommendation

5.1 Conclusion

This research was conducted at Dhaka University to reveal academic use of smartphones among university students. The findings of this research suggest that students fully utilized smartphones as a regular mobile phones as well as a traditional computer and as a means to get access to academic information. The findings also suggest that some of the students do not use smartphones as a means to support their learning. The future research should investigate why the students at Dhaka University are not utilizing smartphones for learning purposes.

Many students at Dhaka University do not use smartphones for their academic purposes properly. They access internet through smartphone for using social media sites. One factor that affects convenience is the speed of the internet connection at the university and the availability of Wi-Fi services which are important for smartphone applications. Nevertheless, academics and educational developers need to encourage the students' use of personal technologies such as smartphones to enhance their learning process. On the smartphone provider side, it is recommended to continuously increase the smartphone functionality to be more relevant to students (Woodcock *et al*. 2012).

Therefore, from our own point of view, as academics and educational developers, there remains a question of what we can or should do about developing innovation in the use of smart technology. Especially when considering the way academics practice is changing through use of their own personal smart devices to support student learning (Nortcliffe and Middleton, 2011). The answer is possibly just to observe the change as an organic phenomenon. However, the emerging evidence suggests it is useful to challenge assumptions about the long-standing behaviors and expectations of both students and staff about accepted practice. We suggest it is timely to pay more attention to the rich and meaningful ways that students are developing themselves for their engagement with the curriculum by using their own smart devices. The idea of Bring Your Own Device (BYOD) is an expression of disruptive innovation. There are clearly perceived benefits to this changed state of engagement, whether considering study, work or a mix of the two. However, further work is needed to look at the

quality of engagement and the opportunities that exist for changing learner and academic expectations.

The education system of developing countries might unarguably be the most prevalent beneficiary of the mobile technologies. Smartphone's are not just supplementary devices for developing countries, but these devices can play integral part of in their education systems. The smartphone provide access to modern society a massive amount of educational and learning resources. In developing countries Smartphone can easily compensates the limited access of internet and data access, which in turn help their infrastructure and education development (Time Pike University of Plymouth, 2011).

Along with their fantastic facilities, smartphone enables students to text, cooperate on social networking sites, check e-mails, play online games, and even watch TV channels. This is one of the sources of distraction. This is not only distracting for the student, but it can also become distracting for other students around them and even sometimes for whole class. In addition, it wouldn't be easy for students to make calls during exams to cheat but it may be easy for pupils in a crowded classroom or examination hall to use their Smartphone's to access information online to cheat in exams. In fact some surprising statistics are there about the use of Smartphone's for cheating in the classroom. The misuse of Smartphone could be through the use of text message exchange with other students, find answers on the Internet, using advanced calculator and phone applications, reading notes saved on their phones to help on the test. Smartphone's can encourage bullying and hazing also. Bullying and hazing are very serious problems in universities across many countries (CollegeDrees.com, 2011)

Overall, research shows that educators do not have very positive attitudes towards smartphone as tools for learning in higher education to date. It is true, however, that students' attention in class needs to be managed by bring up a good idea to manage students' attention in the long run. It encourages professors and educators to design some portions of classes as technology on and other portions as technology off. The blessing of any technology depends on the best use of it. The common phenomenon is that most of the Dhaka University students seem to be unaware of the right use of

smartphone and the software. The Dhaka University students tend to use software for pleasure and recreation purposes. They seem to be callous of the use of smartphone and software for study purposes. They feel it cumbersome of the use of smartphone for study purpose. The students who want to avoid smartphone for study purpose can be called outdated students. If the students could use smartphone and latest invented software for study and learning purposes they could reap out the easiness of study. It could enlighten their whole life.

5.2 Recommendations

It is thus recommend that:

1. Lecturers and the university authorities should encourage the use of smartphones in their lecture rooms or during academic programme of the university.

2. Students should use smartphone a limited amount of time that's does not impact on their study.

3. Students should discard unnecessary android software that kills their important time

4. Students should access to information through smartphone that is relevant to their study.

5. Extravagant use of internet can interrupt their study objectives.

6. Students should use effective apps on their smartphone that is related to their academic activities.

7. Students should use smartphone as learning tools but not an entertainment tools.

8. There should be rules and regulations against the use of smartphone, such rules should be well stated with appropriate measures and guide lines for its enforcement. This is important because, if allowed to be freely used by the student in the lecture rooms, lecture room & others places would turn to be like market place or public square. It would also breed ill feelings among poor students who could not afford to purchase or lack the opportunity to purchase it.

9. Students should be guided and counseled on the use of smartphone at the point of entry for their academic programme on the campus. This would require the services of the university Guidance and Counseling Unit where they would be told how, when and why to use it. This is because they should know the advantages and disadvantages of appropriate time for using smartphone.

10. Most of the students tend to use smartphone to access information of entertainments & sports but they should avoid this trend & give importance on academic arena.

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Appendix

"The Use of Smartphone in accessing information: a case of Dhaka University Students"

[Please put tick (√) mark where applicable]

Section-A: Personal information

1. Department:

2. Status: ☐ Undergraduate ☐ Postgraduate

3. Gender: ☐ Male ☐ Female

4. Age group: ☐ 17-20 years ☐ 21-24 years ☐ 25-29 years ☐ above 30 years

5. Where is your place of origin?
   ☐ Rural area ☐ Small town ☐ City ☐ Metropolitan city

Section-B: Smartphone use

6. Do you own/use a smartphone? ☐ Yes ☐ No

7. If yes, how long have you been using the smartphone?
   ☐ 1- 6 months ☐ 6 months to 1 year
   ☐ 1- 2 years ☐ 2-3 years
   ☐ More than 3 years

8. Which brand and model of smartphone do you use currently?
   ☐ Nokia ☐ Samsung
   ☐ HTC ☐ Apple
   ☐ Symphony ☐ Other, please specify.
   Model ……………………………………

9. Which mobile phone network are you connected to?
   ☐ GP ☐ Banglalink ☐ Citycell
   ☐ Airtel ☐ Robi ☐ Teletalk
   ☐ Other, please specify

10. Do you use internet on your smartphone? ☐ Yes ☐ No

11. If yes, how do you access to internet? ☐ mobile network ☐ Wi-Fi ☐ Both

18. Do you use your smartphone as an alternative to modem to access internet ? ☐ Yes ☐ No

12. How frequently do you access internet via your smartphone?
   ☐ A few times every day   ☐ At least once a day
   ☐ A few times a week   ☐ At least once a week
   ☐ At least once a month   ☐ Other, please specify.

13. Which search engine do you prefer to use on your smartphone for information access?
   ☐ Google   ☐ Opera   ☐ Ask Jeeves ☐ Yahoo!
   ☐ Other, please specify.

14. What types of information on the internet do you generally access through your smartphone (You can select multiple options)?
   ☐ Academic   ☐ Sports   ☐ News   ☐ Music
   ☐ Social media sites   ☐ Entertainment   ☐ Other, please specify

15. Have you ever used your smartphone for academic purposes, such as (You can select multiple options):
   ☐ Reading scholarly articles ☐ Recording class notes   ☐ Reading text books
   ☐ Preparing class routine   ☐ watching learning videos   ☐ Library reference
   ☐ Other, please specify

16. If you answered yes to any of the option in Q. 15, how often do you use smartphone for academic purposes?
   ☐ A few times everyday   ☐ at least once a day
   ☐ A few times a week   ☐ at least once a week
   ☐ At least once a month   ☐ Other, please specify.

17. How important is the smartphone to your academic success?
   ☐ Extremely important   ☐ Important
   ☐ Moderately important   ☐ Not very important
   ☐ Not at all important   ☐ Do not know

18. Do you use any smartphone apps to improve your academic purposes? ☐ Yes ☐ No

19. If yes, which apps do you use? …………………………………………………………….

20. If freely available, would you be interested in downloading apps for academic purposes?
   ☐ Yes   ☐ No

21. If you do not use your smartphone for academic purposes, do you think a smartphones could help:

    a) facilitate learning   ☐ Yes   ☐ No

    b) save time and increase productivity   ☐ Yes   ☐ No

    c) skill development and training   ☐ Yes   ☐ No

    d) finding up-to-date information   ☐ Yes   ☐ No

    e) minimizing faculty-student gaps   ☐ Yes   ☐ No

Section-C: Your opinion on using smartphone for information access

22. Please rate your opinion on the following statements on the advantages of using smartphones (1- lowest, 7 - highest):

Make it easier to search for information relevant to my studies	1	2	3	4	5	6	7
Improve my study skills	1	2	3	4	5	6	7
Make it easier to access and complete my studies	1	2	3	4	5	6	7
Make it easier to participate in class-related discussions	1	2	3	4	5	6	7
Increase my knowledge in my field of study	1	2	3	4	5	6	7
Increase my motivation towards completing my studies	1	2	3	4	5	6	7
Overall academic quality	1	2	3	4	5	6	7

Thank you very much for time. Your opinion will help me to shape my research.

M.A. (2nd semester)

Department of Information Science & Library management

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