Applied Research Series, 2016

An Exploratory Study on Usage of WhatsApp among the Undergraduate and Post-graduate Students of Mysore

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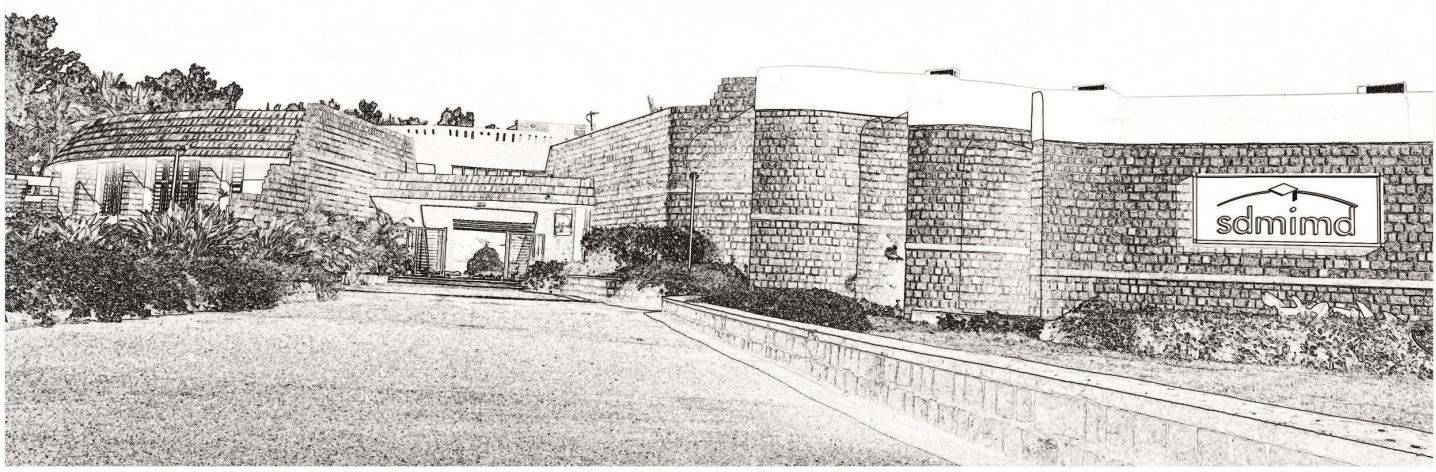
Shri Dharmasthala Manjunatheshwara
Institute for Management Development



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ISBN: 978-93-83302-21-5

Note:

Preface

Research Center for Management Studies (RCMS), which was created five years ago at SDMIMD, has endeavoured to promote research in the field of management education in the Institute, in various ways. The Research Centre has encouraged faculty and students to actively take part in research activities jointly, collate and disseminate findings of the research activities through various types of projects to contribute to the body of knowledge to the academic fraternity in general, and management education in particular.

In this direction, keeping in line with the philosophy of promoting active research in the field of management to capture live situations and issues, the Research Center has taken a unique initiative to sponsor and encourage faculty members to carry out Applied Research Projects in various areas of management.

The duration of these projects is between four to eight months. At the end of the project, after peer review, a publication is taken out with an ISBN number by the institute. The projects help the faculty members, and the students, who work under the supervision of the faculty members for these projects, to identify issues of current importance in the field of management in various sectors. Data is collected mostly through primary research, through interviews and field study.

The institute takes into account the time and resources required by a faculty member to carry out such projects, and, fully sponsors them to cover the various costs of the project work (for data collection, travel, etc), thereby providing a unique opportunity to the two most important institutional stakeholders (faculty and students), to enrich their knowledge by extending their academic activities, outside the classroom learning situation, in the real world.

From the academic viewpoint, these projects provide a unique opportunity to the faculty and the engaging students to get a first-hand experience in knowing problems of targeted organizations or sectors on a face to face basis, thereby, helping in knowledge creation and its transfer, adding to the overall process of learning in a practical manner, with application of knowledge, as the focus of learning pedagogy, which is vital in management education.

Dr. Mousumi Sengupta

Chairperson, SDM RCMS

Acknowledgement

I extend my sincere thanks to the Dr.N.R.Parasuraman, Director-Shri Dharmasthala Manjunatheshwara Institute for Management Development Mysore for his constant support and encouragement throughout the project. I also, express my sincere thanks to Dr.H.Gayathri, Deputy Director-SDMIMD Mysore, for her encouraging words that have motivated me to conduct this research.

I thank Prof.Vasudeva of University of Mysore, Dr.M.R.Suresh, Prof.Govinda Sharma and Prof.Jayakrishnan of SDMIMD, for helping me in designing the questionnaire and also proving needed feedback on the questionnaire designed. I also thank Mr.Kumar, SDMIMD, who has helped in printing the necessary questionnaires to conduct the study.

I thank my faculty colleagues who have encouraged and motivated me through their inspiring words. I also thank non-teaching staff and the accounts department of SDMIMD for their continuous support.

I thank Mr. Siby, student at SDMIMD Mysore for his role in the successful completion of the project. I also thank Mr. Arvind Bhardwaj and Mrs. Ashwini, assistant professor Vidya Vardhaka College, Mysore, for helping me in collecting the data from respondents. I also thank all the students who have participated in this study.

Last but not least, I thank my family members for their constant support and encouragement.

I thank management of SDMIMD for their constant support and inspiration.

I also thank the referee, whose suggestions have improved the presentation of the report.

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Executive Summary

The advancement in the technological developments has changed the life style of the individuals in the society. It can be seen in many aspects that include the way individuals communicate with others in the society. For many years, individuals preferred to communicate using a telephone that connects them quickly to others. In the later stages, with developments in the technology, individuals have moved to communicate using a mobile phone, an email etc. An SMS is a fashion to communicate for many years. With the introduction of social networks, the communication has become very easy and information is reaching people at far distances in seconds. Communication using Facebook is seen as a revolution in the way individuals communicate. With the introduction of WhatsApp communication has become easier and most of the individuals have become closer to their networks faster as compared to other means.

Among different sections of the society, the student community is one section that gets attracted to any technology. The acceptance or rejection of any technology can be attributed to the way student community reacts to it. The usage of WhatsApp is not an exception. The frequent and regular usage of the app by the student community has made even other sections of the society to move towards using the app. Individuals have observed that messages reach faster to their friends, family members etc. as compared to an SMS. Slowly a WhatsApp message has replaced an SMS. Its frequent and excessive usage by the student community has led other sections of the society to conclude that students are wasting time on the app and felt that it is acting as a destructive tool rather than a constructive tool. Studies have been under taken to test this and few studies have revealed that the app is also used for constructive purposes with respect to academic activities. But, few others have revealed that the usage of the app is distracting students from their academic activities and also making them forget to construct sentences properly. This is due to the shorter and code communication that regularly happens between the students via the app. Also, few felt that the app can replace the traditional means for communication, which is hypothetical. We hence have drawn motivation from these to conduct a study on how the students are using the app and also their opinion on how the app has affected their usage of other means. We have taken these two aspects as major motivating factors to conduct the study.

The first section gives the importance of communication and growth of users of WhatsApp. The second section covers the recent literature on the usage of the app amongst the students. Section three gives the motivation to the study and section 4 gives the problem statement of the study. The research questions are covered in section 5. The next section gives the objectives of the study. Section 7 covers the methodology adopted in this study. This section also covers the details of pilot study, questionnaire design, sample size determination, scaling and other related information. Section 8 includes the data analysis and the way we have addressed the objectives of the study. Towards the end we present the experience of the student-intern on the project and also his learnings. We conclude the project by giving view points on how students are perceiving the usage of the app for general and academic, their preferences to the app as compared to the traditional means etc.

Through this project, we have found that majority of the students use a phone call other than WhatsApp, though other means like an SMS, an Email a Facebook message exists as options for communication. A WhatsApp message is preferred only next to a phone call during regular communication. Whereas, among the social networks it is preferred the most. We also have observed that students prefer using the app for sending information related to classes, information related to news the most. They also support government's decision of introducing free Wi-Fi and strongly agreed that due to this users of WhatsApp may increase. Also supported women and police use the app for women safety. Among the general usage, the app is preferred most for chatting, sending images.

Finally we have noted that they prefer to use the app due to factors like motivation from friends, feel that it is a better means of communication, can be used very frequently and preferred by others as well. The other factors are it is latest and comfortable for usage, flexible and easy to use, can be used for academic purposes, used for quick communication, and also students use the app due to its accessibility and safety. The complete analysis and discussion has been presented in the later sections of this report.

1. Introduction

The human life ever since evolution, has undergone many changes and one of the most important change is formation of groups, where individuals live and experience different facets of life. The experiences include those related to family life and those related to professional life. Either the former or later, they all lead to the transformation of an individual, which helps one to trace perfection in life. Among other aspects, the most important aspect is the communication between the individuals or groups. Here, communication is a general communication between two or more individuals in the society. It plays an important role in building relations/ networks in the society and lead a life that will be an inspiration to others.

A powerful communication can bring individuals together and also it has to be on time for effectively building the relations. All those leaders who are successful in life, have used communication effectively and efficiently, which had inspired the society to undergo transformation. One can look at the life of Mahatma Gandhi, who used communication as the main source to light the fiery aspiration among the Indians to gain freedom from the British. Either for the construction or destruction, communication is a very important tool. Any number of such examples can be quoted irrespective of any demographics. A good communicator always heads towards success and ensures that the surroundings are inspired by his words. At the same time an individual who cannot communicate properly faces problems either in professional or non-professional life. This is one of the important reasons why educational institutions adopt a course of communication. Sherwyn and Judy (2008) discusses the importance of having "communication" as a discipline.

There are many means of communication that exists in the society. The traditional means are a phone call, an SMS, an Email, and a Facebook message. The very recent is WhatsApp that has become more popular and playing an important role in communication.

WhatsApp Inc. was founded in 2009 by Brian Acton and Jan Koum, who were earlier employees of Yahoo. Koum had named the app they had developed as "WhatsApp" that sound like "What's up". By February 2013, WhatsApp's user base had swollen to about 200 million active users and its staff to 50. Sequoia invested another $50 million, valuing WhatsApp at $1.5 billion. In January 2015, WhatsApp was the most globally popular messaging app with more than 600 million active users. In April 2015, WhatsApp reached 800 million active users. By September 2015, the user base had grown to 900 million, and by February 2016 it had grown to one billion. On February 9th, 2014 Facebook had acquired WhatsApp for US$ 19 billion. By early January 2015, WhatsApp had 700 million monthly active users with over 30 billion messages being sent every day. In April 2015, Forbes predicted that between 2012 and 2018, the telecommunications industry will lose a combined total of $386 billion because of OTT services like WhatsApp and Skype. That month, WhatsApp had over 800 million active users. On January 18th, 2016, WhatsApp's founder Jan Koum announced that the service would no longer charge their users a $1 annual subscription fee in an effort to remove a barrier faced by some users who do not have a credit card to pay for the service. He also explained that the app would not display any third party advertisement and instead would bring new features such as the ability to communicate with business organizations. (The above information related to WhatsApp has been retrieved from Wikipedia on 3.03.2016- https://en.wikipedia.org/ wiki/WhatsApp). The following tables gives the number of users of WhatsApp worldwide and in India.

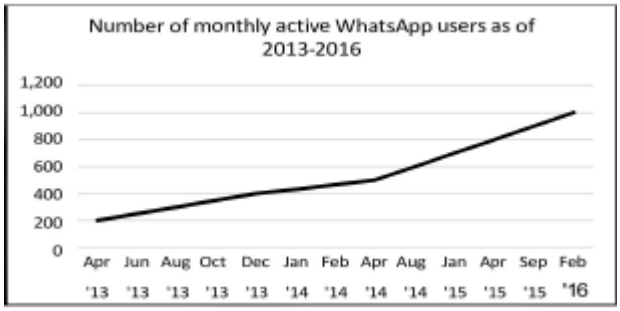
Table-1

Number of monthly active WhatsApp users worldwide fromApril 2013 to February 2016 (in millions)

S.No.	Apr '13	200
1	Jun '13	250
2	Aug '13	300
3	Oct '13	350
4	Dec '13	400
5	Jan '14	430
6	Feb '14	465
7	Apr '14	500
8	Aug '14	600
9	Jan '15	700
10	Apr '15	800
11	Sep '15	900
12	Feb '16	1,000

Source:http://www.statista.com/statistics/260819/number-of-monthly-active-whatsapp-users/-retrieved on 04.02.2016.

Graph-1



Source: Obtained by the researcher based on table-1

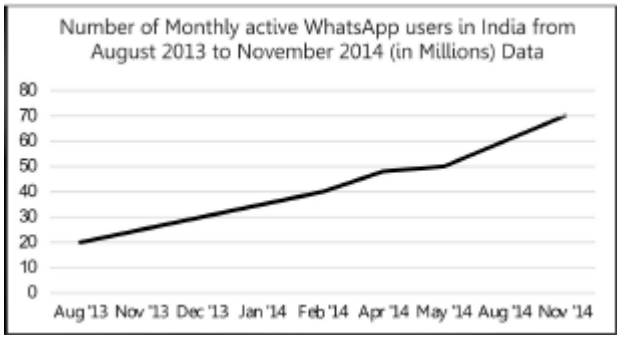
Table – 2

Number of monthly active WhatsApp users in India from August 2013 to November 2014 (in millions)

Sl.No.	Month	Data
1	Aug '13	20
2	Nov '13	25
3	Dec '13	30
4	Jan '14	35
5	Feb '14	40
6	Apr '14	48
7	May '14	50
8	Aug '14	60
9	Nov '14	70

Source:http://www.statista.com/statistics/280914/monthly-active-whatsapp-users-in-india/-retrieved on 12.02.2016

Graph-2



Source: Obtained by the researcher based on table-2

From both the graphs, one can understand how the users for the app are increasing from month to month.

One major reason to select "WhatsApp" as the study subject is due to its popularity in the society and also because of scope it has in communicating the information accurately and precisely. Any information regarding different events, at any part of the globe can be communicated in minutes though this app. One can also expect that this app can replace all other communication methods in near future. With the introduction of different mobiles, built on different platforms, have given an opportunity to use this app in their mobiles. We claim that in the present modern society very few are without this app. The major part of the society uses this for different purposes. Hence, it is necessary for one to identify and classify the way the society is using this app for different purposes. It helps one to note the important activities that are being taken place, based on the messages sent through this app.

Student community is not an exception. The most inquisitive part of the society that looks at new developments faster is the student community. They have started using this app to communicate all the related information among themselves. Looking at this, the educational institutions have started communicating information relating to classes, exams etc., using the app. This has motivated us to choose the student community for our study. **Though the plan was to consider different sections of the people for the study, taking into consideration the difficulties and reach we have decided to restrict our study to student community. This may be one of the limitations of the study.**

In this study, we look at two aspects with respect to the survey on students: the preference (in terms of ranking and usage) that a student give to WhatsApp and his opinion on aspects relating to using WhatsApp for communication. We focus more on his/her perception towards using the app for communication, related to academic activities, his/her preference to the app to Facebook, SMS etc., opinion on using the app for women safety etc. The study looks at identifying (exploring) the factors that motivates a student to choose the app to other means and tries to build a model that confirms the relation between the several factors explored. We also look at whether there exists any difference in the perception towards the app with respect to gender and family status.

2. Literature review

The literature review presented in this section mainly looks at studies related to the usage of the app among the students and studies related to WhatsApp,

its comparison with Facebook. We first present the studies on usage of students by students and then present studies and information on WhatsApp's developments along with comparison with Facebook.

To start with, there can be a question "Do students really prefer WhatsApp"? Bere's (2012) study looks at students' preferences with respect to learning environment. It reveals that students prefer WhatsApp social networking to Blackboard learning management system (known as e-thutho). The study also show that free access, edutainment and multitasking are among the aspects that made WhatsApp a popular. But, one can question on the students' comfort level in using text and instant messaging in education. In this context, Lauricella and Kay (2013) studies students' perception towards using text messaging and instant messaging. Their study looks at comfort level, frequency of use, usefulness, reasons for messaging and differences between peer-to-peer and peer-to-instructor interactions. Students noted that they were very comfortable with using both text and instant messaging. It concluded that both text and instant messaging are useful and viable tools for augmenting student's communication among peers and faculty in higher education. In order to check whether the learning process through WhatsApp improves students' reading and regularity, Gutiérrez-Colon et.al. (2013) conducts a study amongst the students in Spain. It looks at the usage of WhatsApp to improve learners' reading skills in English as a foreign language (EFL). The study concludes that a vast majority of students reported a high level of satisfaction and agreed that not only their willingness to read in English increased, but the experience had also had a positive impact on their reading habits, and had resulted in more regularity and confidence. Now, one can ask for a comparison between a traditional SMS and a WhatsApp message, as text messaging is also possible via an SMS. That is, what factors have motivated for one to move from an SMS to a WhatsApp message. Church and Oliveira (2013) investigates the motives and perceptions of use between WhatsApp and traditional SMS. They also look at the services being offered above and beyond traditional SMS. They have adopted two types of studies an interview study and a large-scale survey. Their study has identified set of dynamic factors that contribute to how users communicate via these services. They note that, cost significantly impacts peoples' frequency of usage and social-influence is one of the main reasons for today's migration to WhatsApp. The nature and intent of WhatsApp messages tend to be more social, informal and conversational in nature, while SMS is seen as more privacy preserving, more formal and generally more reliable. Their evidence shows that neither technology is a substitute for the other. Overall the paper shows that changes in mobile technology influence communication practices of individuals in the society. These studies have provided sufficient information on why one has moved from a traditional SMS to a WhatsApp message and also on how far students are comfortable in adopting the app in their learning process. When it comes to students' learning process, one needs to look into more studies conducted at different geographical locations and cultures. This is because of the heterogeneity that exists in the world.

Tulika and Dhananjay (2014) through their study notes that students find learning through WhatsApp very interesting and educationally useful. They also found that their social interactivity with their peers and teacher has increased and moreover they learned collaboratively. The attitude of the students toward WhatsApp learning was favourable. The study also revealed that married students found learning through WhatsApp disruptive and that they prefer learning in traditional classroom as it does not collide with their family time. This study was conducted in India and more studies conducted at different geographical regions will show the diversity. Annie and Syamimi (2014) studies the usage of WhatsApp among the undergraduate students at Universiti Brunei Darussalam and finds that, WhatsApp-use benefits the undergraduates in terms discussing and sharing information related to study matters, apart from the regular daily communication. Their study also finds few critical issues arising from its frequent use, such as need to attend WhatsApp messages immediately, exposure to false or unregulated information or media contents. However, the study reveals that the undergraduates are rather responsible and cautious in relation to the highlighted issue of disseminating information or media contents of unregulated nature. This opens questions related to the time the students wish to spend on the app and what other features they look in the app. Jyothi Kumari (2014) conducts a

survey and notes that WhatsApp is used widely by youth (also includes the working professionals) and most of the respondents use WhatsApp all the time. The study also notes that users of WhatsApp want video call as one of the features and privacy as another. Is this true in other places and also are the youth willing to joining the groups due to the comfort the app is providing? Avani and Aanal (2014) notes from a survey in Vadodara city that majority of the respondents are using WhatsApp and also wish to join groups in the app. What factors are driving especially the youth towards the use of the app? Richard (2014) conducts a survey among South African youth and makes an attempt at identifying the factors influencing the adoption of WhatsApp. The study notes that cost efficiency, simplicity, user friendly features, and the ability to run on multiple platforms are some on the factors that influence the youth to adopt the app. The previous study on the usage of the app has informed that it has improved the reading skills. When it comes to the question on writing skills, Ahmad (2014) conducts a study among the students in Saudi, to find whether messaging through WhatsApp has improved writing skills especially with respect to selection of words. The study notes that the students involved in the survey enjoyed messaging through the app and results have shown that there is a significant difference between overall writing scores of the pre-test and post-test of the students, who have participated in the experiment. Another interesting study that contradicts the above was conducted in Ghana. Yeboah and Ewur (2014) observes that, WhatsApp instead of making communication easier and faster thereby enhancing effective flow of information and idea sharing among students, rather has impacted negatively on the performance of tertiary students in Ghana. The study among other things unveiled the following: WhatsApp takes much of students study time, results in procrastination related problems, destroys students' spellings and grammatical construction of sentences, leads to lack of concentration during lectures, results in difficulty in balancing online activities (WhatsApp) and academic preparation and distracts students from completing their assignments and adhering to their private studies time table. If the app has distracted few in their learning process, then the question will be "did it effect their achievements and also will the face-to-face learning improve their achievements"? Amry (2014) conducts an experiment to check whether there exists difference between students' learning via WhatsApp and learning face-to- face with respect to their attitudes and achievements. The study find that there is a significant difference between the achievements of students that use WhatsApp for online interaction and students who discuss face-to-face. It shows that the mobile learning technology has helped them in constructing their knowledge base and to share the same with the peers in the group. This method of learning might have affected the phone calls that the students tend to make in need. Yeboah, Nondzor, and Alhaji (2014) conducts a study among the polytechnic students in Ghana, to find their preferences towards a WhatsApp message to a voice call. Their study reveals that though students tend to use WhatsApp more for their daily communication, they haven't ignored the use of a voice call in situations where they have to be more expressive and effective, as well as in their formal communications. The following paragraph has been extracted as it is from their paper,

"It can be established from the study that students are more familiar with voice call than WhatsApp but with those who use both applications, WhatsApp was more preferred to voice calls, with some reasons such as its convenience and easier usage, its effectiveness and reliability, and it saves money. WhatsApp is used by the students to inform about their locations, to coordinate meetings, issues related to coursework, private exchanges of information and arrange for club meetings online etc. Despite its preference, students are sceptical about their personal privacy and data protection. Voice call is still the major dominant choice for the students at certain formal situations especially where they need to be more expressive and effective in their communication as well as familiarity of the messenger by the other communicant".

From the above, it is very clear that WhatsApp is preferred mostly for informal communication and a voice call (regular phone call) is preferred for formal communication. Jesha and Jebakumar (2014) investigates the usage of WhatsApp among the Chennai youth and finds that most of the students spend maximum time on WhatsApp and is helping them to build networks. These studies have focused more on the students. Bouhnik and Deshen (2014)

conducts a study, by employing a qualitative method, among the teachers in Israel. They found that teachers use the app for communication related to academic aspects especially for four main purposes: communicating with students; nurturing the social atmosphere; creating dialogue and encouraging sharing among students; and as a learning platform. The teachers also mentioned that there are advantages in using the app and also challenges. The following are the lines taken from their paper.

"The participants mentioned the technical advantages of WhatsApp, such as simple operation, low cost, availability, and immediacy. They also referred to educational advantages, such as the creation of a pleasant environment and an in-depth acquaintance with fellow students, which had a positive influence upon the manner of conversation. The participants also indicated academic advantages such as the accessibility of learning materials, teacher availability, and the continuation of learning beyond class hours. Nevertheless, there are also challenges and problems. Firstly, there is the technical difficulty that not all high school students possess a Smartphone. Secondly, teachers are apt to be annoyed by the flood of irrelevant and nonsensical messages. Also, educational difficulties may arise, such as incompatibility of language between students and the students' assumptions that their teachers should be available on a 24/7 basis".

Another interesting study was conducted by Alfonso and Olga (2015). They looked at different WhatsApp statuses and examined the types of statuses that were updated by the users of WhatsApp. Their study finds that 65% of the total sample (400 statuses) made an attempt to modify the default status provided by WhatsApp. Also, they look at how different age groups update their statuses. They observe that lower age ranges were prone to make a wider use of purely-iconic statuses, many of them characterised by a severely-marked cryptic character. Conversely, they also noticed that participants belonging to higher age ranges clung to either automatically generated statuses or purely-verbal self-generated ones. This may be explained by the technological skills required both to access the space devoted to one's status (which is not straightforward) and to download the set of emoticons, add to the smartphone keyboard and use it.

Now, one can question on a need for the usage of the app for daily communication apart from the academic communication. Karthikeyan, Tony, and Sanal (2015) studies the impact of WhatsApp among college students in Coimbatore district and concludes that students feel that it is a need for daily communication. Not much is revealed by this study. Navjit, Nidhi, and Jaspreet (2015) conducts a study among the youth of Jalandhar district and notes that there is an association between psychological behavioural factors, measured by Shyness, Moody behaviour, Loneliness and Feeling Stressed, and the use of WhatsApp. It notes that the youth felt stressed without using WhatsApp, check status regularly when felt lonely, moody, and stressed.

Micheal et.al. (2015) investigates group based communication in WhatsApp and provides a classification of group chats and develops a model for group communication. The study alsoindicates that for many people WhatsApp has become an important means of communication. In many situations of life. They note that the main distinctive feature for the classification is whether the topic of a group chat was a unique event, a repetitive event, or no event. By applying these classes to the messaging histories, further properties of the classes could be determined. The following lines are taking from their conclusion,

"A classification method was created, which is able to decide whether a messaging history deals with a unique event or not. According to this method, approximately one third of the collected messaging histories deal with a unique event, and thus, have a limited lifespan. Finally, a communication model of a WhatsApp group chat based on a semi-Markov process was developed. Its transition probabilities are based on the probability of occurrence of certain message sequences and each transition takes the respective inter-arrival time distribution of the subsequent message into account. This model was used to simulate network traffic of WhatsApp group chats. The evaluation of the simulated traffic showed similar properties to network traffic caused by original messaging histories. Thus, this simple model can already be used for the performance evaluation of the WhatsApp service in mobile networks".

Ahmad et.al. (2015) examines the adequacy of a psychometric measure of WhatsApp use and students'

perceived academic performance. They use exploratory factor analysis (EFA) and provides three main constructs labelled as academic communication, perceived academic performance and learning enhancement. All the three factors put together explains 60% of the total variance in the use of WhatsApp and student's perceived academic performance.

Montag et.al. (2015) studies on the use of smartphone and especially the usage of WhatsApp. They look at the association between demographic characteristics, personality traits with the use of WhatsApp. Their data show that use of WhatsApp accounted for 19.83% (= 32.11 min) of all smartphone behaviour (compare: Facebook only 9.38% = 15.19 min). The mean of general daily smartphone usage was 161.95 min. Females used WhatsApp for significantly longer periods of time than males and younger age was associated with longer duration of WhatsApp use. While the personality trait Extraversion was positively associated with daily WhatsApp use, Conscientious-ness showed an inverse correlation with the length of daily WhatsApp use. Important aspect here is that the gender and age are associated with the WhatsApp usage. Jefferey and Musah (2015) looks at using social media in education system in Ghana and observes that WhatsApp stands first among the other social media platforms. The study revealed that majority of respondents used WhatsApp and Facebook for making friends and chatting. In addition, majority of respondents experienced negative effects such as poor grammar and spelling, late submission of assignment, less study time and poor academic performance due to the heavy participation on social media networks. Furthermore, there was a high addiction rate among students in the usage of social media networks. Nevertheless, there were cases where others experienced improvement in their readings skills as a result of participation on social media networks. Also, respondents shared ideas, discussed and shared examination questions among themselves on social media networks. The study recommended the strict enforcement of Ghana Education Service rule on electronic devices usage in schools, promotion of social media usage for academic purpose, counselling for addicted students and the use of the right grammar and spelling when participating on social networks.

Chokri (2015) conducts a survey among the students of Saudi and compares the experimental group and the control group with respect to learning. The study notes that WhatsApp is a good tool for mobile learning when it is used in a blended course strategy. In a blended mobile lecture, mobile applications such as WhatsApp are preferred over face-to-face, in- class discussion in regard to completing course activities. The following are some benefits of the app taken as it is from the paper

"The benefits of the WhatsApp tool in a blended mobile lecture environment are as follows:

- The tool facilitates online discussions and collaboration from school or home in a blended mobile lecture.
- In a blended mobile lecture, online students can easily discuss different topics related to the course taught face-to-face in the classroom.
- The tool facilitates of the creation of a class publication that students can edit and publish by engaging in collaborative and cooperative online activities related to the course taught in the classroom.
- It encourages students to insert text and messages to easily share information and knowledge related to the course taught face to face in a blended mobile lecture. WhatsApp learning technologies can help students integrate videos, podcasts, messages, texts, images and audio files in the blended mobile learning process."

Shobha et.al. (2015) conducts a study among the post-graduate students of Karnataka state Women's University, Vijayapura and identifies PG students' conceptualization and usage of WhatsApp messenger. They also note that a greater majority of post-graduate students access WhatsApp messenger quite regularly for various purposes including educational purposes and concludes that the University has to integrate the mobile technology into learning process and library has to take necessary measures to form groups in the app.

Hashim et.al. (2015) looks through a survey in Malaysia among the students and notes that WhatsApp has enhanced effective flow of information and idea

sharing among students. It also notes that though WhatsApp is helping the students, it has negative impact on the students. The app has taken away much of the study time and lost concentration in classes, academic discussions, distracted from completing assignments, affected students spelling. Sunita and Seeza (2015) tried to show that usage of WhatsApp has negative impact on students in Thane, India. Smit (2015) shows that use of WhatsApp is useful to the students, based on a survey done in South Africa.

Aharony (2016) looks at how attachment theory, a social support perspective, and one personality characteristic derived from the Big Five theory of personality, influence the usage of WhatsApp family group. The findings confirm that the personality characteristic of openness to experience and social support significantly predict the importance of WhatsApp family group. O'Hara et.al. (2014) present a study of WhatsApp and looks at how the options on the app and usage of the app develops an intimacy and belongingness among the individuals of the society. They discuss how an intimate knowing of others in these relationships, through past encounters and knowledge of coming together in the future, pertain to the particular forms of relationship engagements manifest through the possibilities presented in WhatsApp. Karaponas et.al. (2016) conducts a survey among 494 users of Facebook and WhatsApp. They report that WhatsApp is used to unlock new opportunities for intimate communications, to enable creation of micro-communities, and to richly support social practices such as collective life logging and reminiscing, contrasting the popular view of WhatsApp as a mere instant messaging tool. Users' memorable experiences with Facebook, on the other hand, were characterized primarily by non-social uses, pertaining to users' need for information gratification, as well as self-oriented experiences such as acts of self-expression.

Shravan (2015) studies the WhatsApp usage among the male and female and found that there is significant difference between the two. The following are some points taken from the abstract of the paper that gives the summary of the results.

"The present research paper aimed to study the differences in usage of this communication service (WhatsApp) amongst male and female individuals. Literature that deals with socio- linguistic theories has highlighted differences in the way men and women communicate face- to-face and through other mediums. This study indicated that gender did influence the usage of WhatsApp in some cases, but there were a lot of elements like usage style / pattern / preference that showed little or no difference amongst genders. Gender differences were visible in the area of usage of emoticons (greater number of female respondents agreed to use it often); being part of a larger number of groups (men were part of more groups) ; active time spent during the day (men spent lesser time as compared to women) ; changing profile picture and status often (women had the tendency to change the same more number of times) ; sharing emotional outbursts on WhatsApp (women tended to agree to the same more than men) ; and sending pictures of their shopping (merchandise) to friends and family (more women agreed to do that as compared to the male respondents). The research study also found that in a lot of areas, gender did not make a difference, which corroborated with the results of many of the existing studies in this area".

Note from above literature survey that there are studies that claim and try to show that usage of WhatsApp has negative impact on the students. But all these studies are conducted at different places. This may lead to a conclusion that the region and ethnicity plays a role in the opinion towards use of the app. The question is open for further research. Also, none of them have touched on students' opinion on using the app for women safety. We include this in our study as one of the major objectives.

3. Motivation to the Study

In this section, we present the motivation for considering the survey on usage of the app by the students in Mysore city.

The major chuck of users that usually get attracted to any latest developments in technology will be the student community. The success of any technology depends on how the students accept it and spread it. One can observe that the society gets influenced by student community in most of the times and WhatsApp is not an exception. The literature review presented and other details that are not presented but available on different websites, shows one that, most

of the researchers (either academic or corporate) are looking at how the student community is reacting to the app. They look at how it is impacting the students either positively or negatively. There are diversified view points on this and one has to investigate afresh, the impact of the app in his/her region before drawing any conclusions. This is very apparent from the literature review. Few studies supported the use of app by the students while others did not. This could be from the general assumption that the students may get perturbed from their goals, objectives and waste their time on the app. Another point is that the studies were conducted within India and also outside India. Among those that were within India, few oppose the use of the app and few other support the use of the app. The same can be seen even outside India. The perception of the students on the usage (negative or positive) may depend on two aspects: the way the app is used and the purpose of its usage and also the region the students belong to. So one has to investigate on these aspects before drawing any conclusions. Hence, we have decided to study, learn and note how the student community in Mysore is using the app and look at the factors that are motivating them to use the app. Also, study their preference to the app as compared to that of other means especially Facebook. The following are few points extracted from the literature review, which motivated us to conduct the study on students.

1. The app is widely used by the students and students use it regularly for daily communication.
2. The app is useful to improve the writing skills of the students.
3. It is useful to get connected to the peers quickly and communicate with ease.
4. It helps the teachers to interact with the students with ease.
5. The learning using the app is better than face-to-face learning.
6. The app disturbs the students from attending the classes, concentrate properly in the class etc.
7. The app impacts negatively on the students.

These are some statements or conclusions drawn by the researchers with respect to students using the app. We wish to check does the same continue to hold good among the students of Mysore or not. Also, their preferences to the app as compared to Facebook, and SMS etc. We do not look at the above mentioned points specifically but look at from the general perception of the students on using the app for academic related activities. Also, the factors that motivate them to choose the app. The main motivation to study on the usage of the app for women safety is, the decision taken by Karnataka government to provide free Wi-Fi facility in major cities. The question that one can ask is on the use of the app for women safety as, free Wi-Fi enables one to use the app without disruptions. Linking both may help the women to protect themselves from attacks. We construct the objectives with respect to both the aspects and related analysis is presented in later parts of the report.

4. Problem Statement

One of the important development in today's communication is using social networks. This can be seen as an important development as it connects individuals in the society faster than any other means. The information gets shared faster and reaches to corners of the world in seconds. One such development is the WhatsApp, which is being used for messaging and very popular among the instant messaging apps. There are few aspects that are unanswered till date. The students using the app is seen both in a positive way as well as in a negative way. The answers so far are given based on the purpose of the use and the way it is used. But, not many studies have dealt with the factors that lead students to choose the app for daily communication. Also, not many studies have been done in the Indian context and those that exists are not complete. The problem here is to find the preference level given by the students to the app and find the factors responsible for the choice of the app. These aspects are not completely given in the earlier studies.

We restrict ourselves to Mysore city to address the issues raised with respect to students. A similar study can be done in other places by interested researchers and our research will help them framing the necessary inputs. Taking into consideration the above, the

following research questions have been framed in order to address the problems stated in this section.

5. Research Questions

1. What are the preference levels given to WhatsApp as compared to other social networks?
2. What do student community feel about the app and its usage with respect to academic activities and general usage?
3. What is the opinion of the students on government's plan of introducing free Wi-Fi and women, police using the app for safety?
4. What are the factors responsible for a student to choose WhatsApp to other means of communication?

Taking into consideration the above questions, we frame the research objectives and the same have been presented below.

6. Objectives of the study

In this section, we present the objectives of the project.

1. To know the preference levels given by the students to the app as compared to traditional means of communication and also among the social networks.
2. Examine the perception of students on the usage of the app in daily communication and for specific academic related activities.
3. Understand the opinion of students on introducing the free Wi-Fi facility in relation to usage of the app, using the app by women for their safety and police adopting the app for protecting women.
4. Identify the factors that motivate students prefer the usage of WhatsApp for communication.

7. Methodology

In this chapter we discuss the methodology adopted. We also present the details of the pilot study conducted, construction of questionnaire, determination of the sample size, sampling design adopted, reliability of the questionnaire, testing randomness of the sample, testing normality and statistical methods adopted for the data analysis.

7.1. Pilot Study and Questionnaire Design

It has been planned to consider undergraduate and post-graduate students of Mysore as target population and understand their perception towards the usage of WhatsApp. The pilot study has been conducted twice to ensure that the questionnaire to be used for the study will be constructed appropriately and do not miss those items that will capture the view points of the students precisely.

The first pilot study was carried out in Mysore with a sample size of 80 and includes all possible questions related to the app. This study includes students as well as others as respondents. The questionnaire has 100 questions and includes most of the possible questions related to the usage of the app as well as opinion on the app in relation to other means (Facebook, SMS, etc.). This study looked at the comfort level of the respondents in answering the questionnaire, average time taken by a respondent to fill the questionnaire, items that need to be modified and deleted etc. At the end, it has been identified that the questionnaire needs major change and also the difficulties in conducting the survey among various sections of the society were noted.

The initial questionnaire includes questions related to different sections of the society (corporate, business community, students, others). It has been noted by the research team that the questionnaire has to be divided so that specific questions related to students can be in the first part and the second questionnaire consists of items related to others. Another point that the research team has noted is that conducting different studies at one point of time with limited resources is difficult and hence decision has been taken to concentrate more on the student community.

The assumption that we made is that student community can influence the society towards a technology effectively as compared to any other section of the society. The questionnaire has been modified accordingly and only those questions related to the usage of the app by the student community, their perception towards its usage for daily communication (including academics) have been considered. In order to test this, a second pilot study was conducted.

The second pilot study was done by taking responses from the students. The questionnaire consists of only those questions related to students and lists to 20-25 questions. Few questions have sub questions and the sample size for this study was 185. Larger sample size has been taken to ensure that sampling error will be low and also to get better estimates to the inputs needed to estimate the sample size for the actual study. Even in this study, it has been identified that few questions that are important have been missed out.

In order to check for the reliability of the questionnaire, we have used Cronbach alpha. According to George and Mallery (2003), an alpha value >0.8 is considered as good, a value between 0.7 and 0.8 is considered as acceptable, a value between 0.6 and 0.7 is considered as questionable, a value between 0.5 and 0.6 is poor, and value less than 0.5 is unacceptable. The second questionnaire has a reliability Cronbach alpha value of 0.77 which fall in the range of acceptability.

Table-3
Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
.771	.779	21

Source: constructed by the researcher based on data analysis.

This indicates that the questionnaire has good consistency and reliability levels in capturing the viewpoints of the students with respect to the usage of the app. The questionnaire has been further modified by including few questions apart from the existing questions. The third and the last pilot study was done to ensure that the same level of reliability is still met and it has been noted that the questionnaire has got a reliability value above 0.7. In this case, the sample size is taken as 11.

Table-4
Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
.7	.7	2

Source: constructed by the researcher based on data analysis.

Since this is sufficient to conclude that the questionnaire is consistent and reliable, this has been considered as the final questionnaire. Other non-technical aspects like comfort level of the respondents in answering the questionnaire, average time taken etc. also have been considered.

The questionnaires of the study have been given in the appendix. The sample size needed to conduct the actual study has been estimated using the inputs taken from the third pilot study. The minimum sample size required to conduct study has been estimated using standard formula and the estimated sample size happens to be 465.

7.2. Sample Size Determination

The sample size required for the study has been estimated by using the inputs obtained from the pilot study-2. The following table gives the sample size estimated for the study. The research is aimed at studying the perception of the students towards the usage of the app and there are several variables/parameters that have been considered for the same. Now the question is which variable / parameter has to be taken to estimate the sample size? We consider most important variables / parameters and calculate the sample size for each of them. We then take the maximum of all as the sample size required.

The following table gives the details of the variables/parameters considered and the sample size estimated. Here, population mean is considered as the parameter and the last column in the table gives the sample estimate of the same. The half width is the distance between the actual mean and the sample mean, population standard deviation is estimated using the sample standard deviation (calculated from the pilot sample).

Finally, throughout the study we fix the confidence level as 95%, so that the level of significance will be 5%. For the current study on WhatsApp, we have chosen the perception of students towards academic usage, perception on how the app has affected other means of communication and introduction of free Wi-Fi and use of app for women safety as major aspects. Hence, we have considered only those variables related these aspects. The following table gives the same. One has to note that the sample sizes given in

the table below are the minimum sample sizes required to study the behaviour of the respective parameter. Hence, considering the maximum of all will also help studying the behaviour of other parameters as well.

Table-5
Variables and sample size calculation

Sl. No.	Variable	Confidence Level	Half-Width	Estimate of Stdev.	Sample Size	Mean
1	Agree for regular study	95%	0.13	1.29704	383	3.3100
2	Support students using for daily communication	95%	0.13	1.27248	369	3.8693
3	Think that they transfer information relating to classes faster	95%	0.13	1.34985	415	3.6515
4	Agree without app important msgs not reaching	95%	0.13	1.33818	408	2.6350
5	Putting Pics on app stopped posting on Facebook	95%	0.13	1.40316	448	2.5909
6	After started using the app stopped checking mails	95%	0.13	1.40937	452	3.4010
7	Teachers should be a part of the groups	95%	0.13	1.36632	425	3.6500
8	Facebook SMS phone affected by the app	95%	0.13	1.43018	465	3.3909
9	Using an app is better than Facebook, email, phone call	95%	0.13	1.38291	435	3.1465
10	Wish to have free Wi-Fi	95%	0.13	.99020	223	4.3800
11	More people use app due to Wi-Fi	95%	0.13	1.11623	284	4.1515
12	Free Wi-Fi women use app for safety	95%	0.13	1.04279	248	4.3050
13	Support police adopting app for women safety	95%	0.13	1.02245	238	4.4098

Source: constructed by the researcher based on data analysis.

From the above table, one can note that the maximum of all sample sizes is 465 and the corresponding variable is "Facebook and SMS affected by the app", sample standard deviation =1.43, half width is 0.13 and confidence level is 95%. We hence considered this as the final sample size required for the study.

7.3. Sampling Design

The sampling design adopted is the non-probability sampling design. Under this, the sampling units are collected as per their availability and cooperation. The questionnaires have been circulated to students in selected colleges and responses have been collected.

The decision on the sampling design has been taken based on the pilot study. While conducting the pilot study, it has been noted that there are several practical difficulties for adopting a probability sampling design. One such difficulty is designing a sampling frame which is key for adopting a probability sampling design. Other difficulties include getting the individuals as per the selection made using simple random sampling, time etc. In order to overcome these difficulties, convenient sampling design has been adopted. Most of the respondents (99%) are using WhatsApp and before taking the responses, the respondents are asked about their usage and awareness of the app.

7.4. Final Questionnaire of the study

The questionnaire for the study is divided into three parts. The first part deals with the choice of students with respect to traditional means of communication and ranking to the same. It also deals with time when the students check the status of the app, and ranking of the app among other social network options.

The second part of the questionnaire deals with the opinions of the students towards the usage of the

app. It is further divided into sub-parts that deal with opinions on usage of app for daily communication and network building, opinions on usage of the app for women safety police using the app, and opinions on usage of the app for communication better than other traditional means.

The third part of the questionnaire deals with level of usage of the app like average time students spend time on the app, time since they are using the app, number of times students check the app, amount of internet data recharged each time. Finally, the opinion on how the app can be used for academic purpose, how students are using for daily communication, when the students mute their app, and opinion on using the app if it is not cheap/free.

7.5. Scaling and measuring the variables

One of the important aspect in any study is scaling of the variables. We consider all those variables that help us in understanding the opinion of students on the usage of the app and the way they are using the app for daily communication. The variables are measured appropriately using Likert scale. Likert (1932) introduced the scaling that quantifies those variables that are categorical. The scale expands the options related to categorical variables that only ask yes-no responses to strongly agree, agree, neutral, disagree and strongly disagree, which is a five point scale. Similarly, one can use a seven point scale, ten point scale etc.

In this study we have used a five point Likert scale to measure the responses of the students on the usage of the app. After the responses have been taken, weightage has been assigned based on the questions. That is, if the question is a positive question then the weightage will be from 5 to 1 in descending order and if the question is negative then the weightage will be from 1 to 5 in ascending order. In the current study the questions are positive and hence the weightage is from 5 to 1. We also use nominal and ordinal scaling opinions on usage of the app for academic purpose, for those variables that measure the level of usage of the app and the time when students check the status on the app. The detailed scaling of the variables in the study is given in the appendix.

7.6. Reliability of the Questionnaire

We now consider the final sample collected on the questionnaire and test the consistency, reliability of the questionnaire. The following table gives the value of the Cronbach alpha calculated for the final sample.

Table-6
Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
0.768	0.773	28

Source: constructed by the researcher based on data analysis.

From the above table, one can note that the value of alpha is close to 0.77, which is sufficient to claim that the questionnaire considered is reliable and the results obtained are also reliable.

7.7. Testing randomness of the sample

We now consider the important variables of the study and test for their randomness. This is an important aspect in relation with the data analysis as most of the statistical methods assume the sample to be a random sample. We use a run test for checking the randomness of the sample.

Null hypothesis: The sequence of values for each variable measured forms a random sample.

Alternative hypothesis: The sequence of values for each variable measured do not form a random sample. The following table gives the results of the same.

Table-7

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The sequence of values defined by Q5a<=4.00 and >4.00 is random.	One-Sample Runs Test	.138	Retain the null hypothesis.
2	The sequence of values defined by Q5b<=4.00 and >4.00 is random.	One-Sample Runs Test	.749	Retain the null hypothesis.
3	The sequence of values defined by Q5g<=4.00 and >4.00 is random.	One-Sample Runs Test	.816	Retain the null hypothesis.
4	The sequence of values defined by Q5h<=2.00 and >2.00 is random.	One-Sample Runs Test	.272	Retain the null hypothesis.
5	The sequence of values defined by Q5o<=4.00 and >4.00 is random.	One-Sample Runs Test	.931	Retain the null hypothesis.
6	The sequence of values defined by Q5e<=5.00 and >5.00 is random.	One-Sample Runs Test	.301	Retain the null hypothesis.
7	The sequence of values defined by Q6a<=4.00 and >4.00 is random.	One-Sample Runs Test	.589	Retain the null hypothesis.
8	The sequence of values defined by Q6d<=2.00 and >2.00 is random.	One-Sample Runs Test	.324	Retain the null hypothesis.
9	The sequence of values defined by Q6e<=4.00 and >4.00 is random.	One-Sample Runs Test	.817	Retain the null hypothesis.
10	The sequence of values defined by Q6f<=3.00 and >3.00 is random.	One-Sample Runs Test	.238	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Source: constructed by the researcher based on data analysis.

The variables considered are related to usage of app for academic activities, those related to preference level to the app as compared to Facebook, SMS, Phone call. One can refer to appendix for complete meanings of the coded variables. From the above table, one can conclude that the sample considered is a random sample, with respect to the defined variables and objectives of the study.

7.8. Testing Normality of the sample

Null hypothesis: The variables measured to understand the usage of the app follows a normal distribution.

Alternative hypothesis: The variables measured to understand the usage of the app do not follow a normal distribution.

We have used Kolmogorov-Smirnov's test for goodness of fit to test the above hypothesis. From the above results, one can note that the data do not follow a normal distribution and we hence use only non-parametric methods in this study.

Table-8

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Q5a is normal with mean 4.01 and standard deviation 0.89.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
2	The distribution of Q5b is normal with mean 4.01 and standard deviation 0.96.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
3	The distribution of Q5c is normal with mean 4.16 and standard deviation 0.96.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
4	The distribution of Q5d is normal with mean 2.92 and standard deviation 1.25.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
5	The distribution of Q5e is normal with mean 4.35 and standard deviation 0.85.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
6	The distribution of Q5f is normal with mean 3.26 and standard deviation 1.30.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
7	The distribution of Q5g is normal with mean 3.39 and standard deviation 2.70.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
8	The distribution of Q5h is normal with mean 2.78 and standard deviation 1.30.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
9	The distribution of Q5i is normal with mean 2.86 and standard deviation 1.28.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
10	The distribution of Q5j is normal with mean 3.56 and standard deviation 1.10.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
11	The distribution of Q5k is normal with mean 3.62 and standard deviation 1.15.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
12	The distribution of Q5l is normal with mean 4.16 and standard deviation 0.89.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
13	The distribution of Q5m is normal with mean 4.07 and standard deviation 0.96.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
14	The distribution of Q5n is normal with mean 3.45 and standard deviation 1.27.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
15	The distribution of Q5o is normal with mean 3.89 and standard deviation 1.22.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
16	The distribution of Q6a is normal with mean 3.63 and standard deviation 1.15.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
17	The distribution of Q6b is normal with mean 3.87 and standard deviation 1.03.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
18	The distribution of Q6c is normal with mean 3.40 and standard deviation 1.26.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
19	The distribution of Q6d is normal with mean 2.58 and standard deviation 1.23.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
20	The distribution of Q6e is normal with mean 3.87 and standard deviation 1.18.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
21	The distribution of Q6f is normal with mean 3.02 and standard deviation 1.35.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
22	The distribution of Q6g is normal with mean 2.45 and standard deviation 1.26.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
23	The distribution of Q6h is normal with mean 3.78 and standard deviation 1.20.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
24	The distribution of Q6i is normal with mean 3.94 and standard deviation 1.21.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
25	The distribution of Q6j is normal with mean 3.84 and standard deviation 1.22.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
26	The distribution of Q6k is normal with mean 3.81 and standard deviation 1.21.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
27	The distribution of Q6l is normal with mean 3.26 and standard deviation 1.32.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
28	The distribution of Q6m is normal with mean 4.07 and standard deviation 1.03.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Source: constructed by the researcher based on data analysis.

7.9. Details of the sample

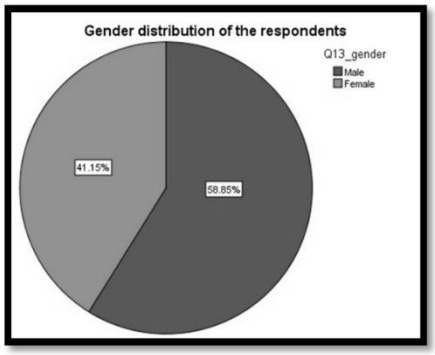
In this section, we present the details of the sample respondents.

Table-9
Gender distribution of the respondents

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	266	58.8	58.8	58.8
Female	186	41.2	41.2	100.0
Total	452	100.0	100.0	

Source: constructed by the researcher based on data analysis.

Graph-3



Source: constructed by the researcher based on data analysis.

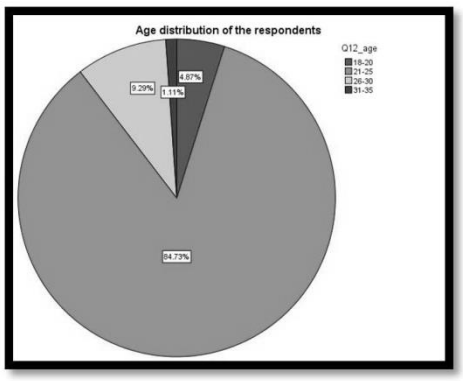
From the table and graph, one can observe that close to 59% are male students and 41% are female students.

Table-10
Age distribution of the respondents

Age	Frequency	Percent	Valid Percent	Cumulative Percent
18-20	22	4.9	4.9	4.9
21-25	383	84.7	84.7	89.6
26-30	42	9.3	9.3	98.9
31-35	5	1.1	1.1	100.0
Total	452	100.0	100.0	

Source: constructed by the researcher based on data analysis.

Graph-4



Source: constructed by the researcher based on data analysis.

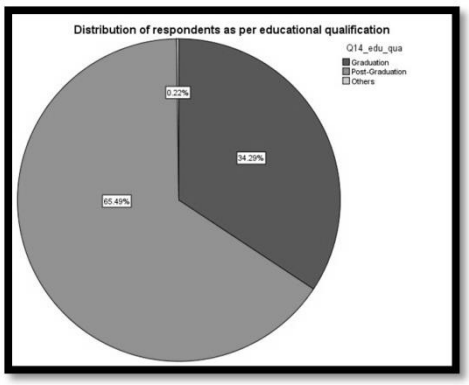
The above details indicate that the sample has students more from the age group 21-25 years and this is obvious from the fact that we have considered only under-graduate and Post- graduate students in Mysore as our target population.

Table-11
Distribution of respondents as per educational qualification

Educational qualification	Frequency	Percent	Valid Percent	Cumulative Percent
Graduation	155	34.3	34.3	34.3
Post-Graduation	296	65.5	65.5	99.8
Others	1	.2	.2	100.0
Total	452	100.0	100.00	

Source: constructed by the researcher based on data analysis.

Graph-5



Source: constructed by the researcher based on data analysis.

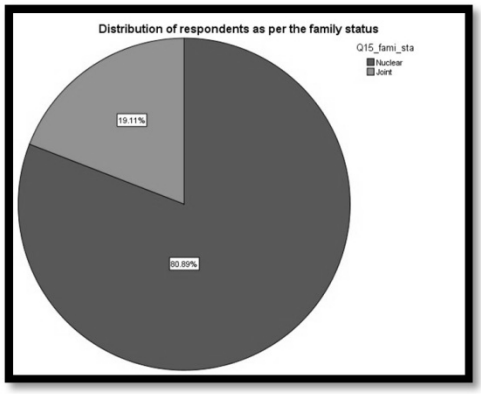
Table-12

Distribution of respondents as per educational qualification

Family Status		Frequency	Percent	Valid Percent	Cumulative Percent
	Nuclear	364	80.5	80.9	80.9
	Joint	86	19.0	19.1	100.0
	Total	450	99.6	100.0	
Missing	99	2	.4		
Total		452	100.0		

Source: constructed by the researcher based on data analysis.

Graph-6



Source: constructed by the researcher based on data analysis

Once can note from the above table that 80.5% of the students are from nuclear families and 19% of them are from joint families. From the details presented, one can note that more students are from age group 21-25 years, are post-graduates, and are from nuclear families. We consider these points as important points for the study and test at each stage of the analysis if there exists any difference between the demographic characteristics. Also, such results are an outcome of convenient sampling in which not much care will be given to the composition of the sample.

We now present the statistics on the family members, level of usage of the app.

Table-13

Distribution of respondents as per the number of family members

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2-3	94	20.8	20.9	20.9
	4-6	296	65.5	65.9	86.9
	6-8	36	8.0	8.0	94.9
	<2 or >8	23	5.1	5.1	100.0
	Total	449	99.3	100.0	
Missing	99	3	.7		
Total		452	100.0		

Source: constructed by the researcher based on data analysis.

Table-14

Frequency distribution of respondents as per time they spend on the App

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1 hr	109	24.1	24.2	24.2
	1-2 hrs	178	39.4	39.5	63.6
	3-4 hrs	117	25.9	25.9	89.6
	Others	47	10.4	10.4	100.0
	Total	451	99.8	100.0	
Missing	99	1	.2		
Total		452	100.0		

Source: constructed by the researcher based on data analysis.

Table-15

Frequency distribution of respondents based on time they are using the App

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1 month	21	4.6	4.7	4.7
	1-3 months	17	3.8	3.8	8.5
	3-6 months	31	6.9	6.9	15.4
	9-12 months	35	7.7	7.8	23.2

	>1 year	345	76.3	76.8	
	Total	449	99.3	100.0	
Missing	99	3	.7		
Total		452	100.0		

Source: constructed by the researcher based on data analysis.

Table-16

Frequency distribution of respondents based on number times they check their status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<5	218	48.2	48.6	48.6
	5-10	94	20.8	20.9	69.5
	10-15	51	11.3	11.4	80.8
	15-20	49	10.8	10.9	91.8
	>20	37	8.2	8.2	100.0
	Total	449	99.3	100.0	
Missing	99	3	.7		
Total		452	100.0		

Source: constructed by the researcher based on data analysis.

Table-17

Frequency distribution of respondents based on amount of data they recharge each time

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	100-150 mb	61	13.5	13.9	13.9
	150-200 mb	34	7.5	7.7	21.6
	200-300 mb	28	6.2	6.4	28.0
	300-500 mb	36	8.0	8.2	36.2
	500-1 gb	127	28.1	28.9	65.1
	>1 gb	153	33.8	34.9	100.0
	Total	439	97.1	100.0	
Missing	99	13	2.9		
Total		452	100.0		

Source: constructed by the researcher based on data analysis.

The above tables give information related to the sample respondents of the study. These tables are self-explanatory and hence not much explanation has been given. They will be used in discussions related to objectives of the study.

7.10. Statistical methods

In this section we discuss the statistical methods used for the analysis. We use frequency tables both univariate and bivariate to analyse the data with respect to usage of the app. Particularly with respect to studying the opinions related to how the app can be used for academic and non- academic activities. Simple percentage analysis has been used to extract the information related to the app. It includes analysis with respect to ranking of the app as compared to other means of communication, ranking of the app as compared to other social networks. Cross tabulation is used for cases where the responses are one among the mutually exclusive choices as well as those responses that are not mutually exclusive choices. For both mutually exclusive tabulation as well as non-mutually exclusive tabulation, we use percentage analysis and provide appropriate interpretation.

In order to test the associations between the opinions with respect to usage of the app, we use Chi-square analysis. We also use Chi-square analysis for testing the hypothesis related to associations. Correspondence analysis, which is one of the dimension reduction techniques in multivariate techniques is used to study the associations between the opinions on the usage of the app. We give more details of this method later in this section. We use factor analysis to find the factors that motivate students to choose the app to other means of communication. We present more details in later part of this section. Note that the statistical methods have been selected based on the objectives of the study. Each objective of the study is addressed separately and conclusions have been given separately. Also, towards the end of the analysis we present the complete discussion based on the data analysis. We now present details of Chi-square analysis, correspondence analysis, and factor analysis.

7.10.1. Chi-square analysis and multiple response analysis

Chi-square analysis is used to test the significance of hypothesized associations between the attributes defined. The definition of the two attributes should give a sense of association in real terms. For example, associating the willingness to use the app for study purpose and their opinion on using the app for sending the academic related activities makes sense.

In this study we use Chi-square analysis to study the associations between the usage of the app and students opinion on using the app for academic purpose, daily communication etc. Also, we use this to study the associations between the gender, family status, and educational qualification with the usage of the app.

The null hypothesis tested is that the two attributes are independent against the alternative hypothesis that the two attributes are dependent. The analysis takes into consideration the observed frequencies and calculates the expected frequencies for each of the category combinations. The condition is that expected frequencies for each category combination has to be at least 5. Otherwise the method cannot be used as it is and one has to make use of pooling technique. The pooling technique combines those category combinations for which the expected frequencies are less than 5 will be combined with other cell frequencies so that the total will be at least 5. Once the condition for expected frequencies is met, the difference between the observed and expected frequencies has to be calculated. If the difference is high then, the test rejects the null hypothesis and does not reject the hypothesis if the difference is not high.

Chi-square analysis is used when the cross tabulation is mutually exclusive. If the response to the question is multiple then, one cannot use the traditional analysis and has to be handled in a different way. One such way is using the multiple response analysis. This counts the frequencies and produces the tables that can be interpreted similar to mutually exclusive analysis. This can be easily done using SPSS. We use this to associate the use of WhatsApp with students' opinion on the way app can be used and the way students are using the app for daily communication.

7.10.2. Correspondence analysis

This is a graphical method and is used to study the associations between the attributes and is an extension of Chi-square analysis. Chi-square analysis only studies the association between the attributes but do not give the association between the categories within an attribute and also categories between the attributes. It helps one to study the association between the categories graphically. It is similar to factor analysis, which is used to reduce the dimension of the original study and express the entire study through few factors. It was proposed by Hirschfeld (1935) and developed by Jean-Paul Benzécri (1973). Correspondence analysis takes into consideration the total number of categories and extracts dimensions that can explain the association between the categories of the two attributes. The two dimensions extracted along with the categories are plotted graphically. Those categories that are close are plotted at points that are close. More details of the method can be found in Greenacre (2007).

7.10.3. Exploratory factor analysis

In some of the studies, there are situations where few variables that are latent have to be found. These latent variables can be found by using the original set of variables. But, the researcher may not know in what combination the variables have to be combined so that the common aspect among them can be extracted appropriately. Exploratory factor analysis (EFA) is widely used for this purpose. EFA takes the original variables and extracts that which is common among the variables. The original variables will be divided into sub-sets of variables and common aspects among them will be extracted separately. Those common aspects form set of latent variables or factors and the set of variables that have been used to find the latent variables can be explained by the same latent variables. That is, each variable can be written as a linear combination of latent variables. Hence, instead of studying the original set of variables, it is sufficient to study the set of latent variables. In order to group the variables, EFA takes into consideration correlation between the variables. A strong correlation between the variables indicate more commonality between them and these variables can be well explained by the set of latent variables. A low correlation may not help much as the commonality between the variables is low. Such variables cannot be explained properly by the latent variables and hence these variables can be excluded from the analysis.

There are few aspects that one have to take into consideration while using the EFA. The first aspect one has to take into consideration before the analysis is KMO and Bartlett's test. The KMO (Kaiser-Meyer-Olkin) test is used to test the sampling adequacy while Bartlett's test is used to test the significance of the correlations between the variables. If the value of the KMO test is at least 0.6 then the sample can be

considered as adequate to conduct the factor analysis. Some others also use at least 0.5 for adequacy. Bartlett's test tests the null hypothesis that the correlations are insignificant against that the correlations are significant. It is desired to have a p-value less than the level of significance, so that the null hypothesis is rejected and this confirms that the correlations between the variables are significant. These two are very critical for factor analysis. The next aspect is to observe the communalities. These communalities indicates the proportion of variance in each variable explained by the factors extracted. If any variable has a communality less than 0.5, it is advised to remove that variable from the analysis as the amount of variance explained by the factors is less than 50%. This is similar to R-square in regression analysis. The next aspect is the total variance extracted by the components from all the variables put together.

Note that, sometimes the direction of the data measured for the variables may be different and the direction of the factors extracted may be slightly different. In other words, the loading of each variable in a factor can be improved. This problem arises because, some variables loads higher on some factors and load lower on some other. To overcome this we use the rotation methods, which improves the loadings of the variables on each of the factors.

In the current study, we use factor analysis to find the factors that motivate the students to select the app for communication.

8. Addressing the Objectives of the study

In this section, we address all the objectives stated. We first study and understand the level of preference given to WhatsApp as compared to traditional means of communication. Then study the opinion of students on usage of the app for academic and general purposes. Next, we look at the opinion of the students on introduction of free Wi-Fi and opinion of students on using the app for women safety by women and police. Towards the end we look at finding the factors that motivate the students to choose the app. We now consider each of the objectives separately and present the analysis along with detailed discussion on each of them.

8.1.To know the preference levels given by the students to the app as compared to traditional means of communication and also among the social networks

Under this we consider two aspects. The first one looks at preference given by the students to a WhatsApp message as compared to traditional means of communication. The traditional means considered in this study are a phone call, an SMS, an Email, and a Facebook message. The second deals with preference given to WhatsApp as compared to social networks. That is, the choice of WhatsApp when one has option of selecting a Facebook, Twitter, and line messenger. The preference given is measured through ranking. One has to understand the difference between the two aspects. The first one looks at the choice at the time of immediate communication whereas the other looks at choice at the time of using social networks for communication. The following table gives the details of students using traditional means other than WhatsApp. We also, present the bootstrap confidence intervals for each of the percentages.

Table-18
Frequency distribution of the students using traditional means

Traditional means	Number of students	Total	Bootstrap 95% Confidence Interval
Phone Call	370 (82.6%)	448	(79%, 85.9%)
SMS	182 (40.6%)	448	(36.2%, 45.1%)
Email	147 (32.8)	448	(28.6%, 37.1%)
Facebook message	99 (22.1%)	448	(18.3%, 25.9%)

Source: constructed by the researcher based on data analysis

From the above table, one can note that 82.6% of the students use phone call for communication other than WhatsApp. If one considers this as probability, then it means that in a random sample of 448 students, the chances that a randomly selected student selecting a phone call among the four means of communication is 0.826. That is, the chances of selecting a phone call as means of communication is high. The chances of selecting a Facebook message for communication is

0.22, which is low. The above statistics indicate that a Phone call stands first among the traditional means of communication, other than WhatsApp, considered in this study, followed by an SMS, an Email and last a Facebook message. The bootstrap confidence intervals suggest that the percentage of students who choose a phone call as an option for communication will be between 79% and 85.9%. That is, the percentage can increase to 85.9% and can decrease to 79% and the chances for this percentage to hold well is 0.95 (95% confidence interval). Similarly, the percentage of students selecting a Facebook message as means of communication is between 18.3% and 25.9%. That is maximum of 25.9% of students will choose a Facebook message as means of communication, which is still low.

In terms of probability, the chances that a randomly selected student choosing a phone call fluctuates between 0.79 and 0.859 and chances that a randomly selected student choosing a Facebook message fluctuates between 0.183 and 0.259. Note that, SMS has a chance of selection between 0.362 and 0.451 and that an Email has a chance between 0.286 and 0.371. This indicates that a student selects either an SMS or an Email with higher chances than a Facebook message. Of course, one can argue that these means have their own places of preference. But, we look at these particularly for immediate communication and to send information to groups. One can observe that these means are being used for the same purpose by the student community. But, the interesting part would be on knowing which means of communication is being preferred by student community the most. An SMS can be sent to selected group of members at a time, an email can reach to group of target individuals, and a Facebook message can take the information to distances. Hence, a comparison makes sense and one can correlate the frequency of usage for immediate communication to the selected groups. From the above, one can conclude that even if one repeatedly takes samples of same size from the same population of students, the percentage of students that choose a phone call for immediate communication is high and a Facebook message is low. Also, one can generalize the statement that most of the students choose a phone call as means of communication other than WhatsApp, among the population of students considered in this study.

The question related to the above in the questionnaire is a multiple option question. That is, the respondent can give multiple options as response. We now present a table that gives the cross tabulation for number of students using different means. The importance of the table is that it gives number of students who use other means as well, within the total number of students using one means. The major difference between this and the traditional cross tabulation is that, the classification here is not mutually exclusive. That is a student who appears in one combination can also appear in other combinations as well.

Table-19
Cross tabulation of traditional means

			Traditional means				**Total**
			Phone Call	**SMS**	**Email**	**Facebook message**	
Traditional means	**Phone Call**	**Count**		136	135	75	370
		% within Other means		36.8%	36.5%	20.3%	
	SMS	Count	136		74	46	182
		% within Other means	74.7%		40.7%	25.3%	
	Email	Count	135	74		51	147
		% within Other means	91.8%	50.3%		34.7%	
	Facebook Message	Count	75	46	51		99
		% within Other means	75.8%	46.5%	51.5%		
Total		Count	370	182	147	99	444

Source: constructed by the researcher based on data analysis.

From the above table, one can note that within 370 students who have opted a phone call for communication, 136 also have opted an SMS as means of communication and 135 also have opted an Email

as means of communication. But, only 75 have opted a Facebook message. Note that, here opting means the student has planned to use it but does not mean he has used it. Though a student opts a phone call, still he can use an SMS for communication. We hence, look at conditional probability to study the chances of a student opting other means when a phone call has been already opted by a student.

A Phone call vs an SMS : If we look at the entire sample of 444 students, 370 students have opted a phone call alone and among the same 444 students 182 have opted an SMS alone and have opted both. One can compare this with a Venn diagram where there are intersections between the events. In terms of conditional probability, the chances that a randomly selected student opting an SMS given that he/she has opted a phone call for communication, is 0.368 and the probability of selection fluctuates between 0.3236 and 0.4124. Whereas the chances of selecting a phone call within those who have selected an SMS is 0.747 and the probability fluctuates between 0.6868 and 0.8072. That is, take all those who have opted only SMS as means and if one asks the chances of one of them opting a phone call also as means, then the chances are 0.747 and these chances can increase to 0.80 and decrease to 0.68. But, if one takes all those who have opted a phone call as means and ask the same question with respect to an SMS, the chances are 0.368 and the chances can increase to 0.41 and decrease to 0.32. One can conclude that the increment or decrement in the chances, for either of the means, is due to fluctuations in the preferences of students to that means as compared to other means. That is, if more students tend to select a phone call to an SMS, the percentage of selection for a phone call can increase and vice-versa.

A Phone call vs an Email : Within 370 students who have opted a phone call for immediate communication, 135 (36.5%) also have opted an email for immediate communication. Within 147 students who have opted an email for communication, 135 (91.8%) have opted a phone call. Note that, 135 are those who have selected both. In terms of conditional probability, one can note that the chances of opting a phone call given that the student has selected an email is 0.918 and fluctuates between 0.8753 and 0.9607. The chance that a student opts an email given that he has opted a phone call is 0.365 and fluctuates between 0.3207 and 0.4093.

A Phone call vs a Facebook message : Within 370 students who have opted a phone call, 75 (20.3%) of them also opted a Facebook message. Within 99 students who have opted a Facebook message, 75 (75.8%) of them have also opted a phone call. Again in terms of probability, the chance that a student opts for a phone call given that he has opted a Facebook message is 0.758 and for a student who has already opted a phone call, the chances of opting a Facebook is 0.203. The probabilities mentioned fluctuate between (0.6732, 0.8420) and (0.1617, 0.2437) respectively. This means that, when one opts already a phone call as means of communication, the chances that the same person selecting other means is low. But, if one opts means other than a phone call and ask for the chances of opting a phone call also, then the chances are very high. This is something interesting. Hence, we conclude that when the communication is immediate the chances of opting a phone call as means of communication is very high and even if other means are opted, the chances of selecting a phone call as means will be high.

Checking the differences with respect to demographic characteristics: One can question whether these preferences change with respect to demographic characteristics (age, gender, family status, educational qualification). The following table gives the results of Chi-square analysis, used for checking these differences. Under this, we look at each of the means separately and test whether there exists a difference between the categories of each of the characteristic. For example we test whether there exists difference in the preference between male and female, between nuclear and joint family status, and between graduates and post-graduates.

Null hypothesis: There exists no difference between the categories of a characteristic with respect to means of communication.

Alternative hypothesis: There exists difference between the categories of a characteristic with respect to means of communication

Table-20

Associations between the means and characteristics

Means / Characteristic	A Phone call	An SMS	An Email	A Facebook message
Gender	p-value=0.700 No Difference	p-value=0.036 Difference	p-value=0.008 Difference	p-value=0.208 No Difference
Family status	p-value=0.513 No Difference	p-value=0.560 No Difference	p-value=0.714 No Difference	p-value=0.469 No Difference
Educational qualification	p-value=0.001 Difference	p-value=0.874 No Difference	p-value=0.0001 Difference	p-value=0.079 No Difference

Source: Constructed by the researcher based on the data analysis

No difference: There is no association or there is no significant difference with respect to the demographic characteristic. **Difference:** There is an association or there is significant difference with respect to the demographic characteristic.

From the above table, one can note that preference to a phone call differed significantly with respect to educational qualification. Preference to an SMS differed significantly with respect to gender and preference to an email differed significantly with respect to gender, and educational qualification. Preference to a Facebook message is not significantly different with respect to any of the demographic characteristic. Note that the testing has been carried out based on bootstrap cross tabulation. This indicates that while concluding on the preference related to a phone call, one has to take into consideration the educational qualification, concluding on the preference to an SMS one has to take into consideration gender, and for preference to an email one has to take into consideration gender and educational qualification. **From the above analysis, we conclude that a phone call is a preferred option among the traditional means of communication other than WhatsApp and significant difference exists between the graduates and post-graduates with respect to preference towards a phone call. As mentioned earlier, one has to take into consideration the demographic characteristics while concluding on the preferences related to traditional means of communication.**

The interesting part would be studying the preferences given to a WhatsApp message as compared to traditional means. The difference between this and the analysis presented till now is that, the analysis presented informs one, only the number/ percentage of users for each of the means other than WhatsApp and gives one, an opportunity to know which means is opted more by the users other than WhatsApp. Whereas the analysis and the discussion presented in the next section deals with comparing WhatsApp with traditional means. One has to carefully note this difference.

Comparison of traditional means with a WhatsApp message

Under this, we look at the ranking given to the means of communication along with a WhatsApp message and then argue on the importance of each of the means in association with a WhatsApp message. We use simple percentage analysis to know about the priorities, bootstrapping to draw inferences, cross tabulation and correspondence analysis for testing the association between traditional means and a WhatsApp message. Towards the end we also look whether the preferences differ with respect to demographic characteristics and usage characteristics. The following table gives the ranking given to WhatsApp and other means of communication by the students.

Table-21
Frequency distribution for ranking of traditional means

Means \ Ranking	1	2	3	4	5	Total
Phone call	241(55%)	84(19.2%)	28(6.4%)	26(5.9%)	59(13.5%)	438
Confidence intervals	(50.5, 59.6)	(15.5, 22.8)	(4.1, 8.7)	(3.9, 8.2)	(10.5, 16.7)	
SMS	29(6.6%)	101(23.1%)	146(33.3%)	108(24.7%)	54(12.3%)	438
Confidence intervals	(4.3, 9.1)	(19.2, 26.9)	(29.0, 37.7)	(20.8, 28.8)	(9.4, 15.5)	
Email	21(4.8%)	72(16.0%)	120(26.9%)	134(30.6%)	95(21.7%	438
Confidence intervals	(3.0, 6.8)	(12.6, 19.4)	(22.8, 31.1.)	(26.5, 34.9)	(18.0, 25.6)	
WhatsApp message	118(26.9%)	144(32.9%)	90(20.5%)	61(13.9%)	25(5.7%)	438
Confidence intervals	(22.8, 31.1)	(28.5, 37.2)	(16.7, 24.4)	(10.7, 17.1)	(3.7, 8.0)	
Facebook message	27(6.2%)	42(9.6%)	56(12.8%)	109(24.9%)	204(46.6%)	438
Confidence intervals	(4.1, 8.7)	(6.8, 12.6)	(9.8, 16.0)	(20.8, 29.0)	(41.8, 51.1)	

Source: Constructed by the researcher from data analysis

From the above analysis, we conclude that WhatsApp is preferred second to a phone call and first to a Facebook message, with respect to ranking 1 to the means. Again in terms of probability, the chances of selecting a WhatsApp message as means of communication is 0.269 and that of a phone call is 0.55. Including the second rank, chances of preferring a phone call is 0.692 and that of a WhatsApp message is 0.598. This indicates that still a phone call is a preferred means of communication even a WhatsApp message is available. But, one can note that the chances of selecting a WhatsApp message as second means of communication is 0.329 and combining the ranks 1 and 2, the chances are almost close. The bootstrap confidence intervals indicate how the percentages fluctuate with respect to preferences. One can note that the percentage of the students who prefer an SMS and an Email is also low. One can also note that the preference to a phone call has come down as compared to the analysis presented earlier. This may lead to a conclusion that there is some association between the preferences to a phone call and a preference to a WhatsApp message. In order to test these associations, we first use simple percentage analysis, conditional probability and later use correspondence analysis.

The cross tabulation presented below takes into consideration the categories (rankings in this case) of a phone call and associate them with categories of a WhatsApp message. That is the cross tabulation takes those who preferred a phone call and then looks at the number of students who prefer a WhatsApp message at all the category levels and vice-versa. This helps one to note the category combinations for which the frequencies are high. Note that the classification is a mutually exclusive classification.

Association between preference to a WhatsApp message and a Phone call

We now look at cross tabulation between ranking of a phone call and WhatsApp message

Table-22

Cross tabulation of a phone call and a WhatsApp message

			A Phone Call (Q3a)					Total
			1	**2**	**3**	**4**	**5**	
A WhatsApp message (Q3d)	**1**	Count	1	66	20	13	20	120
		% within Q3d	0.8%	55.0%	16.7%	10.8%	16.7%	100.0%
		% within Q3a	0.4%	77.6%	71.4%	50.0%	33.3%	27.1%
	2	Count	127	0	4	3	10	144
		% within Q3d	88.2%	0.0%	2.8%	2.1%	6.9%	100.0%
		% within Q3a	52.3%	0.0%	14.3%	11.5%	16.7%	32.6%
	3	Count	69	10	0	2	10	91
		% within Q3d	75.8%	11.0%	0.0%	2.2%	11.0%	100.0%
		% within Q3a	28.4%	11.8%	0.0%	7.7%	16.7%	20.6%
	4	Count	33	7	2	0	19	61
		% within Q3d	54.1%	11.5%	3.3%	0.0%	31.1%	100.0%
		% within Q3a	13.6%	8.2%	7.1%	0.0%	31.7%	13.8%
	5	Count	13	2	2	8	1	26
		% within Q3d	50.0%	7.7%	7.7%	30.8%	3.8%	100.0%
		% within Q3a	5.3%	2.4%	7.1%	30.8%	1.7%	5.9%
Total		Count	243	85	28	26	60	442
		% within Q3d	55.0%	19.2%	6.3%	5.9%	13.6%	100.0%
		% within Q3a	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: constructed by the researcher based on data analysis.

The above table can be seen as a frequency table as well as a conditional probability table. Note that among those who have ranked a WhatsApp message as 1, 66 of them have chosen a phone call as their second option. Whereas, among those who have opted a phone call as means, 127 have opted a WhatsApp message as second option. In terms of probability, the chances of selecting a phone call as second priority by those who have selected a WhatsApp message as first priority is 0.55 and the chances can fluctuate between (0.5778, 0.7422). The chances of opting a WhatsApp message as second priority by those who opted a phone call as first priority is 0.523 and can fluctuate between (0.4602, 0.5819). From the confidence intervals one can note that the chances of preferring a phone call as second priority by those who have opted a WhatsApp message as first priority is higher than other means. Interesting part in the analysis is, the chances of selecting a phone call as first priority among those who have opted a WhatsApp message as last is 0.5 and can fluctuate between (0.3090, 0.6910). Similarly, the chances of selecting WhatsApp message as first priority among those who have opted a phone call as last priority is 0.33 and fluctuate between (0.2158, 0.4508). This indicates that even among those who have opted a WhatsApp message for communication as first priority, a phone call has high priority than other means.

The above discussion may lead to a hypothesis that preference to a phone call and preference to a WhatsApp message are associated significantly. To test this hypothesis, we use correspondence analysis. Correspondence analysis helps one to not only test the association between the two attributes but also look at the association between the categories of the two attributes. Using this we can look at the closeness of different categories.

Table-23
Summary of the analysis

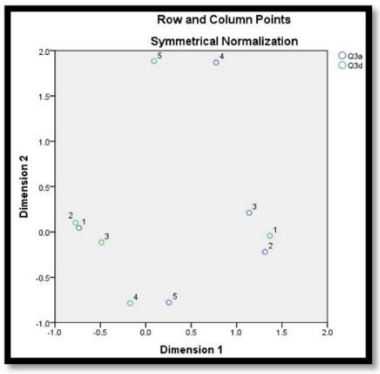
Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	Standard Deviation	Correlation 2
1	.755	.570			.819	.819	.025	.018
2	.301	.090			.130	.949	.062	
3	.175	.031			.044	.993		
4	.071	.005			.007	1.000		
Total		.696	307.739	.0001a	1.000	1.000		
a. 16 degrees of freedom								

Source: constructed by the researcher based on data analysis.

From the above table, one can note that the p-value for Chi-square analysis is less than alpha, which indicates the association between the two is significant. That is, whenever a student prefers a phone call as means one has to also look at his preference levels on a WhatsApp message and vice-versa. The inferences drawn on preferences to a phone call have to be linked with that of a WhatsApp message and vice-versa. Now, one can look at the association between the categories of the two means graphically. The graph helps one to know the categories that are close to each other and also find those that are not close. The closeness between the categories can be understood properly through the following graph.

Graph-7

Distribution of categories of both the means



Source: Constructed by the researcher from data analysis

From the above graph, one can observe that the rankings 1 and 2 for both the means are close and also least rankings are moderately close to each other. From this one can conclude that the association is low. The contingency coefficient value is -0.251 and the corresponding p-value is 0.0001. This indicates that the association is low negative and significant. The 95% bootstrap confidence interval for the association fluctuates between -0.336 and -.0167.

We now look at the priority given to other means of communication when a phone call is given a last priority. The following table gives the distribution of other means including WhatsApp as compared to a phone call, when it becomes the last priority. We are considering this to find in absence of a phone call, which means is being given as priority for communication by the students.

Table-24

Frequency distribution of ranking for all means

Ranking / Means	1	2	3	4	Total
SMS	8 (13.3%)	11 (18.3%)	19 (31.7%)	22 (36.7%)	60
Confidence intervals	(5.3, 22.5)	(8.9, 28.8)	(20.3, 43.6)	(24.2, 49.2)	
Email	10 (16.7%)	20 (33.3%)	22 (36.7%)	8 (13.3%)	60
Confidence intervals	(7.8, 26.6)	(21.7, 45.5)	(25.0, 49.2)	(5.3, 22.4)	
WhatsApp message	20 (33.3%)	10(16.7%)	10 (16.7%)	20 (33.3%)	60
Confidence intervals	(21.4, 45.5)	(7.8, 26.7)	(8.0, 26.7)	(20.3, 43.9)	
Facebook message	19 (32.2%)	20 (33.3%)	9 (15%)	12 (20%)	60
Confidence intervals	(20.3, 43.7)	(21.4, 45.6)	(6.5, 24.6)	(10.03,29.97)	

Source: constructed by the researcher based on data analysis.

From the above table, one can note that when a phone call is given the last priority, a WhatsApp message and a Facebook message have been given almost equal chance of selecting as means o fcommunication. We now look at association between preference to a Facebook message and preference to a WhatsApp message

Association between preference to a Facebook message and a WhatsApp message

Table-25

Cross tabulation of preference to a Facebook message and a WhatsApp message

			A Facebook message (Q3e)					Total
			1	2	3	4	5	
A WhatsApp Message (Q3d)	1	Count	0	23	23	31	41	118
		% within Q3d	0.0%	19.5%	19.5%	26.3%	34.7%	100.0%
		% within Q3e	0.0%	54.8%	41.1%	28.2%	20.1%	26.9%
	2	Count	8	0	21	38	77	144
		% within Q3d	5.6%	0.0%	14.6%	26.4%	53.5%	100.0%
		% within Q3e	29.6%	0.0%	37.5%	34.5%	37.7%	32.8%
	3	Count	6	5	0	30	49	90
		% within Q3d	6.7%	5.6%	0.0%	33.3%	54.4%	100.0%
		% within Q3e	22.2%	11.9%	0.0%	27.3%	24.0%	20.5%
	4	Count	9	9	6	0	37	61
		% within Q3d	14.8%	14.8%	9.8%	0.0%	60.7%	100.0%
		% within Q3e	33.3%	21.4%	10.7%	0.0%	18.1%	13.9%
	5	Count	4	5	6	11	0	26
		% within Q3d	15.4%	19.2%	23.1%	42.3%	0.0%	100.0%
		% within Q3e	14.8%	11.9%	10.7%	10.0%	0.0%	5.9%
Total		Count	27	42	56	110	204	439
		% within Q3d	6.2%	9.6%	12.8%	25.1%	46.5%	100.0%
		% within Q3e	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: constructed by the researcher based on data analysis

From the above table one can note that there are 439 students who have responded to the question completely and ranked the two means stated above in the table. Among these students, very few have selected a Facebook message as first priority and most of them have preferred a WhatsApp message as their priority (look at ranks 1 and 2 given to the app). Also, given that the first priority as WhatsApp, the chances of selecting a Facebook message as last priority is 0.61 (including 4 and 5 ranks) and the chances can

fluctuate between 0.5246 and 0.6954. Note that the lower limit is above 0.5.

Similarly, the chances that a student prefers a Facebook as last priority if WhatsApp is second priority is 0.79 (including 4 and 5 ranks) and the same fluctuates between 0.7259 and 0.8541.In both the cases, the chances of opting Facebook message last is high. But, the chances of selecting a WhatsApp message as first priority given that Facebook message is last, is 0.577 (1 and 2 ranks together) and fluctuates between 0.5127 and 0.6413.

Similarly, if the app is last choice, the chances of opting Facebook first is 0.154, which is low and fluctuates between (0.0161, 0.2919). Even opting Facebook as second option, the chances are only 0.192 and fluctuates between (0.0416, 0.3424).

From this we can conclude that Facebook message is not the choice of the students even if WhatsApp is the last choice, in the absence of a phone call. This indicates that if WhatsApp is given the last priority, one cannot think that a Facebook message will be given the priority. These points give one a sense that both attributes are associated and we now test the association between the two using correspondence analysis.

Table-26

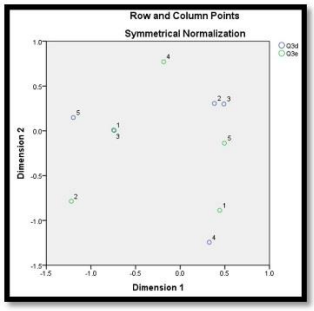
Summary of the analysis

Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	Standard Deviation	Correlation 2
1	.347	.120			.476	.476	.045	-.216
2	.265	.070			.279	.756	.034	
3	.187	.035			.139	.895		
4	.162	.026			.105	1.000		
Total		.252	110.620	.0001a	1.000	1.000		
a. 16 degrees of freedom								

Source: constructed by the researcher based on data analysis.

The Chi-square value and the p-value indicate that the two are associated and the following graph gives the closeness among the categories of the two means.

Graph-8



Source: constructed by the researcher based on data analysis.

The above graph indicates a very low association between the two means. The contingency coefficient value is 0.020 and the corresponding p-value is 0.648. This indicates that the degree of association is low and is not significant. The 95% bootstrap confidence interval is given by (-0.064, 0.105). That is, the Chi-square analysis confirms that there is an association between the two attributes but the degree of association (closeness of the categories) is low and not significant.

We now present the association between preference to a WhatsApp message and preference to an SMS.

Association between preference to a WhatsApp message and an SMS

Table-27

Cross tabulation of preference to an SMS and a WhatsApp message

			An SMS (Q3b)					Total
			1	**2**	**3**	**4**	**5**	
A WhatsApp Message (Q3d)	**1**	Count	0	13	34	52	20	119
		% within Q3d	0.0%	10.9%	28.6%	43.7%	16.8%	100.0%
		% within Q3b	0.0%	12.9%	23.3%	47.7%	37.0%	27.1%
	2	Count	6	2	74	35	27	144
		% within Q3d	4.2%	1.4%	51.4%	24.3%	18.8%	100.0%
		% within Q3b	20.7%	2.0%	50.7%	32.1%	50.0%	32.8%
	3	Count	10	55	1	20	4	90
		% within Q3d	11.1%	61.1%	1.1%	22.2%	4.4%	100.0%
		% within Q3b	34.5%	54.5%	0.7%	18.3%	7.4%	20.5%
	4	Count	7	18	31	2	3	61
		% within Q3d	11.5%	29.5%	50.8%	3.3%	4.9%	100.0%
		% within Q3b	24.1%	17.8%	21.2%	1.8%	5.6%	13.9%
	5	Count	6	13	6	0	0	25
		% within Q3d	24.0%	52.0%	24.0%	0.0%	0.0%	100.0%
		% within Q3b	20.7%	12.9%	4.1%	0.0%	0.0%	5.7%
Total		Count	29	101	146	109	54	439
		% within Q3d	6.6%	23.0%	33.3%	24.8%	12.3%	100.0%
		% within Q3b	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: constructed by the researcher based on data analysis.

From the above table one can note that as SMS is preferred as the first choice is only by 29 students. There are 25 students who said they prefer a WhatsApp message as last priority and among those only 6 of them have opted an SMS as first priority. This indicates that SMS is not a priority even if WhatsApp is a last priority. Note that, among those who preferred a WhatsApp message as first priority, 72 students

have preferred an SMS as last priority (including 4 and 5 ranks).

Even among those who chose a WhatsApp message as second priority, 62 students have preferred an SMS as last priority. These indicate that the chances that a student choose an SMS when the priority is a WhatsApp message is low. This also indicates that there is some association between preference to a WhatsApp message and preference to an SMS. We again use correspondence analysis.

Table-28

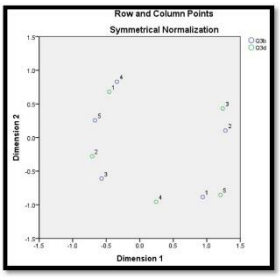
Summary of the analysis

Dimension	**Singular Value**	**Inertia**	**Chi Square**	**Sig.**	**Proportion of Inertia**		**Confidence Singular Value**	
					Accounted for	**Cumulative**	**Standard Deviation**	**Correlation 2**
1	.625	.391			.744	.744	.036	-.173
2	.357	.128			.243	.987	.040	
3	.071	.005			.010	.996		
4	.044	.002			.004	1.000		
Total		.526	230.774	.0001	1.000	1.000		

Source: constructed by the researcher based on data analysis.

The Chi-square analysis indicates that the association is significant. That is, as expected, the association exists between the preference given to a WhatsApp message and preference given to an SMS. The following graph gives the closeness between the categories of the two attributes.

Graph-9



Source: constructed by the researcher based on data analysis.

From the above graph, one can note that the association is moderate and negative. The contingency coefficient is -0.399 and the p-value is 0.0001. This indicates that there exists significant moderate negative association between the categories of two attributes. The 95% bootstrap confidence interval is given by (-0.462, -0.338).

We now check if there exists any difference between the categories of demographic characteristics – Gender, educational qualification, and family status. In this case we look at whether the ranking giving to different means is different with respect to categories of demographic characteristic

Table-29

Associations between the means and characteristics

Means / Characteristic	A WhatsApp Message	A Phone call	An SMS	An Email	A Facebook message
Gender	p-value=0.582 No Difference	p-value=0.0001 Difference	p-value=0.001 Difference	p-value=0.0001 Difference	p-value=0.006 Difference
Family status	p-value=0.028 Difference	p-value=0.248 No Difference	p-value=0.007 Difference	p-value=0.010 Difference	p-value=0.192 No Difference
Educational qualification	p-value=0.157 No Difference	p-value=0.0001 Difference	p-value=0.156 No Difference	p-value=0.591 No Difference	p-value=0.065 No Difference

Source: Constructed by the researcher based on the analysis

No difference: There is no association or there is no significant difference with respect to the demographic characteristic.

Difference: There is an association or there is significant difference with respect to the demographic characteristic.

We now look whether the level of usage has an association with the ranking given to a WhatsApp message. The level of usage characteristics include average time spent on the app, time since using the app, and average number of times one checks the status. We use correspondence analysis for the same.

Average time spent on the app vs ranking on the app

Null Hypothesis: There is no association between the average time spent on the app and the ranking given to the app.

Alternative hypothesis: There is significant association between the average time spent on the app and the ranking given to the app.

Table-30

Correspondence Table								
			A WhatsApp message (Q3d)					Total
			1	2	3	4	5	
Average time spent of the app	<1 hr	Count	13	38	34	19	4	108
		% within average time spent	12.0%	35.2%	31.5%	17.6%	3.7%	100.0%
		% within Q3d	10.9%	26.6%	37.4%	31.7%	16.0%	24.7%
	1-2 hrs	Count	45	58	42	21	9	175
		% within average time spent	25.7%	33.1%	24.0%	12.0%	5.1%	100.0%
		% within Q3d	37.8%	40.6%	46.2%	35.0%	36.0%	40.0%
	3-4 hrs	Count	43	36	12	14	7	112
		% within average time spent	38.4%	32.1%	10.7%	12.5%	6.2%	100.0%
		% within Q3d	36.1%	25.2%	13.2%	23.3%	28.0%	25.6%
	Others	Count	18	11	3	6	5	43
		% within average time spent	41.9%	25.6%	7.0%	14.0%	11.6%	100.0%
		% within Q3d	15.1%	7.7%	3.3%	10.0%	20.0%	9.8%
Total		Count	119	143	91	60	25	438
		% within average time spent	27.2%	32.6%	20.8%	13.7%	5.7%	100.0%
		% within Q3d	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: constructed by the researcher based on data analysis.

From the above table, one can observe that, among those students who have given ranks 1 and 2 to a WhatsApp message, 37.8% and 40.6% of the students spend on average between 1-2 hours of time on the app respectively and 36.1% and 25.2% of students spend on average between 3-4 hours of time on the app respectively. This can be understood better in terms of probability. The chances that a student who has given first priority to a WhatsApp message spends 1-2 hours of time on average is 0.378 and fluctuates between (0.2909, 0.4651) in the population with 95% confidence.

Similarly, the chances that a student who has given second priority to a WhatsApp message spends 1-2 hours of time on average is 0.406 and fluctuates between (0.3255, 0.4865) in the population with 95% confidence. The chances with respect to 3-4 hours are respectively 0.361 (fluctuates between (0.2747, 0.4473)) and 0.252 (fluctuates between (0.1808, 0.3232)).

From these two we conclude with more probability that, a student who gives first priority to a WhatsApp message spend on average 1-2 hours on the app. We now test the association between the two attributes.

Table-31

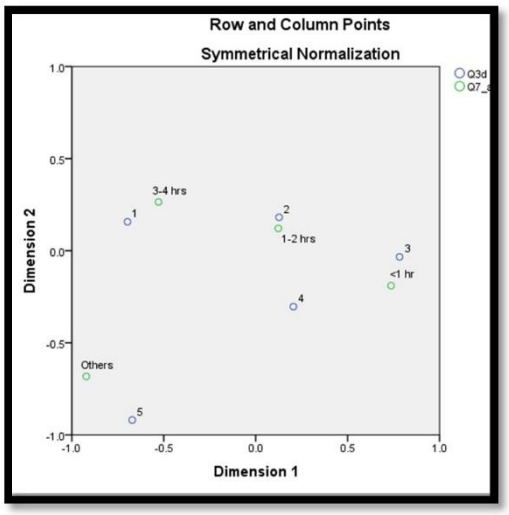
Summary of the analysis

Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	Standard Deviation	Correlation 2
1	.296	.088			.909	.909	.042	.049
2	.080	.006			.066	.975	.056	
3	.050	.002			.025	1.000		
Total		.097	42.757	.0001a	1.000	1.000		
a. 12 degrees of freedom								

Source: constructed by the researcher based on data analysis.

From the chi-square value and the p-value one can conclude that there exists significant association between both the attributes. We now examine which of the categories are close to high ranking to the app.

Graph-10



Source: constructed by the researcher based on data analysis.

One can note from the above graph that ranking 1 is close to 3-4 hrs, 2 is close to 1-2 hrs, and 3 is close to <1 hr. This indicates that students who spend more time on the app tend to give high rankings to the app.

Note that this method do not indicate the cause and effect relation between the ranking and the time spent. It only gives the closeness and from this one can only conclude that a high ranking to the app is associated with high usage of the app. To be more specific, one can say that the tendency of students giving high ranking to the app is associated with high usage. But, one cannot conclude that the high ranking is due to high usage of the app. The contingency coefficient that gives the degree of association is -0.153, p-value is 0.0001 and the 95% confidence interval for the degree of association is (-0.233, -.0.072).

Time since using the app vs ranking to the app

Null hypothesis: The time since one is using the app has no association with the ranking to a WhatsApp message.

Alternative hypothesis: The time since one is using the app has significant association with the ranking to a WhatsApp message.

Table-32

Cross tabulation of a WhatsApp message and time since using the app

			A WhatsApp message (Q3d)					Total
			1	**2**	**3**	**4**	**5**	
Time since using the app	< 1 month	Count	1	8	6	2	3	20
		% within time since using the app	5.0%	40.0%	30.0%	10.0%	15.0%	100.0%
		% within Q3d	0.8%	5.6%	6.6%	3.3%	12.0%	4.6%
	1-3 months	Count	6	3	5	3	0	17
		% within time since using the app	35.3%	17.6%	29.4%	17.6%	0.0%	100.0%
		% within Q3d	5.0%	2.1%	5.5%	5.0%	0.0%	3.9%
	3-6 months	Count	4	6	11	3	5	29
		% within time since using the app	13.8%	20.7%	37.9%	10.3%	17.2%	100.0%
		% within Q3d	3.4%	4.2%	12.1%	5.0%	20.0%	6.6%
	9-12 months	Count	7	10	10	7	0	34
		% within time since using the app	20.6%	29.4%	29.4%	20.6%	0.0%	100.0%
		% within Q3d	5.9%	7.0%	11.0%	11.7%	0.0%	7.8%
	> 1 year	Count	**101**	**116**	59	45	17	338
		% within time since using the app	29.9%	34.3%	17.5%	13.3%	5.0%	100.0%
		% within Q3d	84.9%	81.1%	64.8%	75.0%	68.0%	77.2%
Total		Count	119	143	91	60	25	438
		% within time since using the app	27.2%	32.6%	20.8%	13.7%	5.7%	100.0%
		% within Q3d	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: constructed by the researcher based on data analysis.

From the above table, one can note that more students who have given either first or second priority are using the app since more than one year. This is very apparent from the frequencies corresponding to > 1 year and rankings 1 and 2 to the app. Also among those who have given first priority, 84.9% of the students are using the app since more than one year and even those who have given the app second priority, 81.1% of the students are using the app since more than one year. In terms of conditional probability, the chances that a student who has given first priority to a WhatsApp message, should have been using the app since more than one year is 0.849 and fluctuates between (0.7847, 0.9133). Similarly, the chances that a student who has given second priority to the app should have been using the app since more than one year is 0.811. From these two, one can conclude with higher chance that, a student who gives either first priority or second priority to the app should have been using the app since more than one year. We now test the association between the two using correspondence analysis.

Table-33

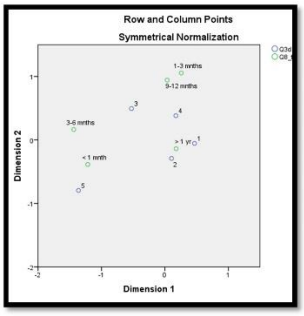
Summary of the analysis

Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	Standard Deviation	Correlation 2
1	.230	.053			.679	.679	.056	-.073
2	.135	.018			.234	.913	.044	
3	.082	.007			.086	.999		
4	.009	.000			.001	1.000		
Total		.078	34.272	.005a	1.000	1.000		
a. 16 degrees of freedom								

Source: constructed by the researcher based on data analysis

The Chi-square value and the p-value indicate that there is a significant association between the time since one is using the app and raking given to the app. That is, a student's priority to the app is not independent of his/her time since using the app. If one is interested to comment on a student's priority towards the app then, one has to take into consideration the time since him/her using the app. We now look at the categories that are close to each other with respect to both the attributes.

Graph-11



Source: constructed by the researcher based on data analysis.

From the above graph one can note that rankings 1 and 2 are close to usage to the app > 1 year.

This indicates that the high ranking of the app is associated with more time since one is using the app. The contingency coefficient that gives the degree of association is -0.130, p-value is 0.0001 and the 95% confidence interval for the degree of association is (-0.207, -.0.050).

Average number of times one checks the status vs ranking on the app

Null hypothesis: The average number of times one check the status and ranking to the app are independent.

Alternative hypothesis: The average number of times one check the status and ranking to the app are dependent.

Table-34

Cross tabulation of preference to a WhatsApp message and average number of checks

			A WhatsApp message (Q3d)					Total
			1	2	3	4	5	
Average number times check status	<5	Count	57	65	53	27	11	213
		% within check status	26.8%	30.5%	24.9%	12.7%	5.2%	100.0%
		% within Q3d	47.9%	45.5%	58.2%	45.0%	44.0%	48.6%
	5-10	Count	18	34	18	15	5	90
		% within check status	20.0%	37.8%	20.0%	16.7%	5.6%	100.0%
		% within Q3d	15.1%	23.8%	19.8%	25.0%	20.0%	20.5%
	10-15	Count	12	18	12	8	1	51
		% within check status	23.5%	35.3%	23.5%	15.7%	2.0%	100.0%
		% within Q3d	10.1%	12.6%	13.2%	13.3%	4.0%	11.6%
	15-20	Count	22	14	6	3	4	49
		% within check status	44.9%	28.6%	12.2%	6.1%	8.2%	100.0%
		% within Q3d	18.5%	9.8%	6.6%	5.0%	16.0%	11.2%
	>20	Count	10	12	2	7	4	35
		% within check status	28.6%	34.3%	5.7%	20.0%	11.4%	100.0%
		% within Q3d	8.4%	8.4%	2.2%	11.7%	16.0%	8.0%
Total		Count	119	143	91	60	25	438
		% within check status	27.2%	32.6%	20.8%	13.7%	5.7%	100.0%
		% within Q3d	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: constructed by the researcher based on data analysis.

From the above table, one can note that 48.6% of the total students check the status less than five times. Among them 26.8% of the students opted a WhatsApp message as first priority, 30.5% opted a WhatsApp message as second priority. In terms of probability, the chance a student selects a WhatsApp message as first priority, given that he checks the status <5 times is 0.268 and second priority, given that he checks the status <5 times is 0.305. We now test the significance of association. The p-value indicates both are independent.

Table-35

Summary of the analysis

Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	Standard Deviation	Correlation
								2
1	.181	.033			.609	.609	.047	-.051
2	.135	.018			.338	.947	.046	
3	.048	.002			.043	.990		
4	.023	.001			.010	1.000		
Total		.054	23.709	.096a	1.000	1.000		

Source: constructed by the researcher based on data analysis.

8.1.1. Preference to WhatsApp among the social networks

We now look at ranking of the app among the social networks. That is, the preference level given to the app among the social networks considered in this study, is given below. It includes frequencies and corresponding confidence intervals for each of the means. We present the complete table including the bootstrap confidence intervals and later present the analysis in terms of probability.

Table-36

Frequency distribution of social networks

	1	2	3	4
Facebook	73(16.4%)	293(65.8%)	58(13.0%)	21(4.7%)
Bootstrap Confidence interval	(0.1296, 0.1985)	(0.6139, 0.7021)	(0.0988, 0.1612)	(0.0273, 0.0643)
WhatsApp	343(76.4%)	74(16.5%)	15(3.3%)	17(3.8%)
Bootstrap Confidence interval	(0.7245, 0.8035)	(0.1305, 0.1995)	(0.0164, 0.0496)	(0.0202, 0.0558)
Twitter	18(4.3%)	58(13.7%)	289(68.5%)	57(13.5%)
Bootstrap Confidence interval	(0.0242, 0.0618)	(0.1051, 0.1689)	(0.6418, 0.7282)	(0.1033, 0.1667)
Line	14(3.4%)	19(4.6%)	58(14.0%)	321(77.5%)
Bootstrap Confidence interval	(0.0172, 0.0508)	(0.0265, 0.0655)	(0.1078, 0.1722)	(0.7362, 0.8138)

Source: constructed by the researcher based on data analysis.

The above table clearly indicates that WhatsApp is ranked 1 more number of times as compared to other social networks. Facebook is ranked 1 only 73 times and this indicates that among social networks, WhatsApp is given the first priority.

In terms of probability, the chances that a student selects a WhatsApp message first among the social networks listed here is 0.764 and the chances fluctuate between (0.7245, 0.8035) in the population with 95% confidence. Note that a Facebook is ranked 2 more number of times and the chances that a student selects Facebook as second means is 0.658 and the chances fluctuates between (0.6139, 0.7021) in the population with 95% confidence.

The third priority is Twitter with 68.5% of the students opting it and in terms of probability the chances a student selects twitter as third priority is 0.685 with confidence interval for chances (0.6405, 0.7292). Line is the last one to be preferred by the students and the chances are 0.775 with confidence interval (0.7352, 0.8156). This indicates how popular WhatsApp is among the social networks. The bootstrap confidence intervals helps one to understand how the percentage of students preferring each of the means fluctuate. We now look at the associations between the preferences of a WhatsApp message and Facebook message.

Association between the WhatsApp and Facebook among the social networks

The following table gives the cross tabulation of WhatsApp and Facebook.

Table-37

Cross tabulation of WhatsApp and Facebook

			WhatsApp (Q19_b)				Total
			1	2	3	4	
Facebook (Q19_a)	1	Count	1	63	6	3	73
		% within Q19_a	1.4%	86.3%	8.2%	4.1%	100.0%
		% within Q19_b	0.3%	85.1%	40.0%	17.6%	16.4%
	2	Count	286	0	5	2	293
		% within Q19_a	97.6%	0.0%	1.7%	0.7%	100.0%
		% within Q19_b	84.4%	0.0%	33.3%	11.8%	65.8%
	3	Count	40	7	0	11	58
		% within Q19_a	69.0%	12.1%	0.0%	19.0%	100.0%

		% within Q19_b	11.8%	9.5%	0.0%	64.7%	13.0%
	4	Count	12	4	4	1	21
		% within Q19_a	57.1%	19.0%	19.0%	4.8%	100.0%
		% within Q19_b	3.5%	5.4%	26.7%	5.9%	4.7%
Total		Count	339	74	15	17	445
		% within Q19_a	76.2%	16.6%	3.4%	3.8%	100.0%
		% within Q19_b	100.0%	100.0%	100.0%	100.0%	100.0%

Source: constructed by the researcher based on data analysis.

Note from the above table that among those who choose WhatsApp as first option, 286 have chosen Facebook as second option. Similarly, among those who preferred Facebook as first priority, 63 of them have opted WhatsApp as second.

In terms of probability, the chances that a student selects a Facebook as second, given that his first priority is WhatsApp is 0.844 and the chances fluctuates between (0.8050, 0.8823) in the population with 95% confidence. This is very high and indicates that a student tend to choose Facebook immediately if WhatsApp do not take his/ her message properly. Similarly, the chances that a student opts a WhatsApp message as first priority when a student thinks of opting a Facebook message as second priority is 0.976 and the chances fluctuate between (0.9586, 0.9936). From this and the pattern of frequencies across the table against pairs of combinations, one can note that both are complimentary to each other. In order to test the association, we use correspondence analysis.

Table-38

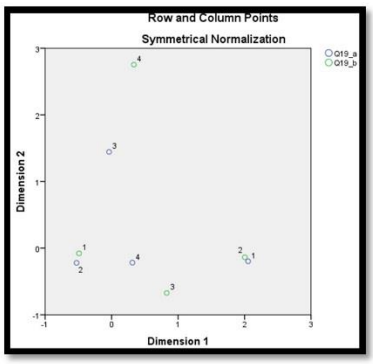
Summary of the analysis

Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	S.D	Correlation 2
1	.879	.773			.854	.854	.021	.180
2	.313	.098			.108	.962	.070	
3	.185	.034			.038	1.000		
Total		.905	402.511	.0001	1.000	1.000		

Source: constructed by the researcher based on data analysis.

The Chi-square value and the p-value in the above table indicates that both preference to WhatsApp and Facebook are associated with each other. That is, we can only conclude that those who preferred a Facebook also have preferred WhatsApp as their next option and vice-versa. Now, the following graph gives the association between the categories of the both means among the social networks. We now look at the closeness among the categories of the two attributes, using the following graph.

Graph-12



Source: constructed by the researcher based on data analysis.

From the above graph, one can observe the closeness of the rankings given to Facebook and WhatsApp. Rankings 1, 2 are very close to each other and this indicates that Facebook and WhatsApp are preferred as complementary to each other. This is because ranking 1 of Facebook is close to ranking 2 to

WhatsApp and vice-versa. That is, those who have chosen Facebook as first preference chose WhatsApp as second preference and vice-versa. The contingency coefficient that gives the degree of association is -0.347, p-value is 0.0001 and the 95% confidence interval for the degree of association is (-0.472, -.0.219).

We now check if there exists any difference between the categories of demographic and level of usage characteristics with respect to preference given to the app as compared to social networks.

Table-39
Results of Chi-square test for association

Means / Characteristic	Facebook	WhatsApp	Twitter	Line messenger
Gender	p-value=0.066 No Difference	p-value=0.017 No Difference	p-value=0.622 No Difference	p-value=0.700 No Difference
Educational qualification	p-value=0.021 Difference	p-value=0.011 No Difference	p-value=0.510 No Difference	p-value=0.232 No Difference
Family status	p-value=0.756 No Difference	p-value=0.498 No Difference	p-value=0.340 No Difference	p-value=0.725 No Difference
Average time spent	p-value=0.403 No Difference	p-value=0.504 No Difference	p-value=0.088 No Difference	p-value=0.546 No Difference
Time since using the app	p-value=0.135 No Difference	p-value=0.497 No Difference	p-value=0.354 No Difference	p-value=0.368 No Difference
Average number times check status	p-value=0.138 No Difference	p-value=0.412 No Difference	p-value=-.210 No Difference	p-value=0.433 No Difference

Source: constructed by the researcher based on data analysis.

No difference: There is no association or there is no significant difference with respect to the demographic characteristic.

Difference: There is an association or there is significant difference with respect to the demographic characteristic.

Observations from the above analysis : From the above discussion, we conclude that students' first choice for immediate communication is a phone call and second choice is a WhatsApp message and they prefer in only few cases a Facebook message, an SMS and an Email. The correlations revealed that a phone call and a WhatsApp message are complimentary to each other and also a phone call and Facebook are negatively-closely related than a WhatsApp message. Also, a WhatsApp message has replaced an SMS. All these indicate that usage of WhatsApp has an effect on other means but not on a phone call. This is particularly with respect to immediate communication.

From the analysis related to social networks, we conclude that WhatsApp occupies first place as compared to Facebook, Twitter, and Line. WhatsApp and Facebook are negatively associated to each other. This indicates that they are complementary to each other.

The above aspects only deal with preference of the app to other means. But do not, cover the perception of the students on the app in detail. We hence have looked at other aspects related to the same. Also, the above analysis and conclusions motivate one to study further what the students feel about the app and also how they prefer to use the app.

We look at their perception on how the app has affected other means. Finally, relate the results to

those presented in the literature review with respect to academic usage and daily communication.

8.2 Examine the Perception of students on the usage of the app in daily communication and for specific academic related activities.

We now move on to the objective of finding out the usage of the app with respect to academic activities (class information, subject matters etc.) as well as for general use (sending images, videos, chatting etc.). The tables are constructed based on the opinion given by the students on how the app can be used by them related to academics and their actual usage towards sending messages, images, videos etc. One can note that analysis is a composition of students who agree the usage of app as well as who do not agree the usage of the app. The agreement and disagreement of the usage of the app towards the academic activities is captured in questions 5 and 6 (see final questionnaire in appendix). There are students who have said that they disagree the usage and there are students who said they agree the usage. But, all the students were asked to give their opinion on the usage and the same have been recorded. In the later parts of this section, we associate these responses with the students' opinion on either agreeing or disagreeing the use of WhatsApp for academic purposes.

The discussion below is on the opinions gathered with respect to usage of the app for academic related activities. Note that the response to the question can be multiple options. That is the respondent has a choice of selecting any number of options listed. For example he/she can choose the usage of the app for sending information related to classes, subject matters, entertainment and fests. One can choose in any combination and also all of them.

Table-40

Details of students with respect to usage of WhatsApp

Usage of the App-Information related to	Number	Percentage of cases (out of 450)	95% Confidence interval for percentages
Classes	310	68.9%	(64.61%, 73.17%)
Subject matters or quick updates on news	277	61.6%	(57.06%, 66.05%)
Entertainment and fests	210	46.7%	(42.06%, 51.28%)
Recent trends in curriculum	170	37.8%	(33.30%, 42.26%)
Other matters	35	7.8%	(5.3%, 10.25%)

Source: constructed by the researcher based on data analysis

The above table gives the opinion of students' on usage of WhatsApp with respect to academics. Note that this is based on students' opinion on how the app can be used. From the above table, one can note that majority of the students suggest the use of the app for sending information related to classes and information related to subject matters or quick updates on news. The number 310 indicates that out of 450, 310 have suggested the usage of the app for sending information related to classes alone. Similarly, 277 suggested the usage of the app for sending information related to subject matters or quick updates on news only. One has to note that among those who supported the usage of the app for one choice, there are some who also supported other usage. In terms of probability, the chances that a randomly selected student suggesting to use the app the app for sending information related to classes is 0.689, sending formation for subject matters or quick updates on news is 0.616, entertainment and fests is0.467, recent trends in curriculum is 0.378, and other academic matters is 0.078. The 95% confidence intervals give the extent the probabilities of above events related to usage of the app can fluctuate in the population.

We now look at the statistics related to those who have supported the multiple usage. The following table gives the statistics related to those who supported multiple usage.

Table-41

Cross tabulation between the usages of the app

			TOT				
			A1	**A2**	**A3**	**A4**	**A5**
TOT	**A1**	Count	**-**	190	172	142	20
		% within	-	68.6%	81.9%	83.5%	57.1%
		Confidence interval	-	(63.13%, 74.06%)	(76.70%, 87.11)	(77.95%, 89.11%)	(40.75%, 73.54%)
	A2	Count	190	**-**	136	131	15
		% within	61.3%	-	64.8%	77.1%	42.9%
		Confidence interval	(55.87%, 66.71%)	-	(58.30%, 71.22%)	(70.74%, 83.38%)	(26.46%, 59.25%)
	A3	Count	172	136	**-**	110	13
		% within	55.5%	49.1%	-	64.7%	37.1%
		Confidence interval	(49.95%, 61.02%)	(43.21%, 54.98%)	-	(57.52%, 71.89%)	(21.14%, 53.15%)
	A4	Count	142	131	110	**-**	12
		% within	45.8%	47.3%	52.4%	-	34.3%
		Confidence interval	(40.26%, 51.35%)	(41.41%, 53.17%)	(45.63%, 59.14%)	-	(18.56%, 50.01%)
	A5	Count	20	15	13	12	**-**
		% within	6.5%	5.4%	6.2%	7.1%	-
		Confidence interval	(3.7%, 9.1%)	(2.75%, 8.08%)	(2.93%, 9.45%)	(3.21%, 10.91%)	-
	Only Ai		**310**	**277**	**210**	**170**	**35**

Source: constructed by the researcher based on data analysis

A1: Classes. A2: Subject matters or quick updates on news. A3: Entertainment and fests. A4: Recent trends in curriculum. A5: Other academic related. TOT: Total Academic related activities.

Note: The above table is not the contingency table with mutually exclusive classification. It gives details of the respondents who have given multiple opinions on the same question. Hence, one has to be cautious while interpreting the tables presented in this section.

There are 310 respondents who felt that the app can be used for sending the information related classes alone. That is, if one wishes to know exactly how many of 450 said the app can be used for sending information related to classes only, then the answer is 310. But, these 310 would have preferred using the app for other purposes also. The table gives even these details. 190 felt that the app can be used for both sending information related to classes and subject matters. That is within 310 students who felt the app can be used for classes, 190 also felt that the app can be used for subject matters. In terms of probability, the chance that a randomly picked student opting the app for sending information related to classes and subject matters or quick updates on new is 0.613 and the chances can fluctuate in the population between (0.5587, 0.6671). Similarly, 172 felt that the app can also be used for sending information related to entertainment and fests. Similarly, 142 and 20 also felt that the app can be used for recent trends in the curriculum, and other academic related activities respectively. This indicates that most of the students preferred using the app for subject matters also, whenever they use the app for information related to

classes. A similar interpretation can be made for other options and the details are omitted.

We now present analysis of students' usage of the app for sending images, videos etc., in daily communication. We consider these activities using the app as general usage. Again the question can get a multiple response as the answer. Similar analysis as above is presented below. But the difference is that the above analysis is based on opinions on possible use of WhatsApp in academics and the analysis below is based on the actual usage of the app for daily communication. One has to clearly note this difference, which is very important before drawing any conclusions about the usage of the app by the students. The following table gives the statistics on the use of WhatsApp for different general activities.

Table-42

Details of usage of the App

Usage of the App	Number	Percentage	Confidence interval
Send Images	272	60.4%	(56.0%, 64.9%)
Sharing Videos	176	39.1%	(34.7%, 43.6%)
Sending news and other related information	249	55.3%	(50.7%, 60.0%)
Chatting	347	77.1%	(73.1%, 80.9%)

Source: constructed by the researcher based on data analysis.

From the above table, one can note that most of the students use the app for chatting followed by sending images and sending news. The chances that a student uses the app for sending images are 0.604, sharing videos is 0.391, sending news and other related information is 0.56 and for chatting is 0.771. Among all a student using the app for chatting has higher chances, followed by others. From the confidence intervals, one can observe that the probability of chatting can increase to 0.809 and can decrease to 0.771, which is still high. The least usage can be attributed to sharing videos. One interesting point is that sending images, sending news and other related information have chances up to 0.6. This indicates that, though students use the app for multiple purposes the above three have higher chances of usage. Hence, if one is interested to draw inferences about the students' usage of the app for general purpose, then the above three have to be taken first. We now present the cross tabulation for multiple responses.

Table-43

Cross tabulation of general usages of the app

			TOT				Total
			B1	B2	B3	B4	
TOT	B1	Count	-	148	154	243	272
		% within	-	84.1%	61.8%	70.0%	
		Confidence interval	-	(78.69%, 89.49%)	(55.81%, 67.88%)	(65.21%, 74.85%)	
	B2	Count	148	-	118	146	176
		% within	54.4%	-	47.4%	42.1%	
		Confidence interval	(48.49%, 60.33%)	-	(41.19%, 53.59%)	(36.88%, 47.27%)	
	B3	Count	154	118	-	191	249
		% within	56.6%	67.0%	-	55.0%	

		Confidence interval	(50.73%, 62.51%)	(60.10%, 73.99%)	-	(49.81%, 60.28%)	
	B4	Count	243	146	191	-	347
		% within	89.3%	83.0%	76.7%	-	
		Confidence interval	(85.67%, 93.01%)	(77.40%, 88.51%)	(71.46%, 81.96%)	-	
Total		Count	272	176	249	347	445

Source: constructed by the researcher based on data analysis.

B1: Sending images. B2: Sharing Videos. B3: Sending news and other related information. B4: Chatting. TOT: Total usage.

From the above table, one can note that 272 students use the app for sending images alone and within 272, 148 also use for sharing videos, 154 also use for sending news and related information, 243 also use for chatting. The respective probabilities can be obtained from the percentages given and the confidence intervals help one to understand the extent to which the probabilities fluctuate.

Table-44

Use the app for study purpose

Q5a									
		Frequency	Percent	Valid Percent	Cumulative Percent	Bootstrap for Percenta			
						Bias	Std. Error	95% Confidence Interval	
								Lower	Upper
Valid	1	11	2.4	2.4	2.4	.0	.7	1.1	4.0
	2	34	7.6	7.6	10.0	.0	1.2	5.1	10.0
	3	8	1.8	1.8	11.8	.0	.6	.7	3.1
	4	285	63.3	63.3	75.1	.0	2.3	58.9	67.8
	5	112	24.9	24.9	100.0	.0	2.1	20.9	28.9
	Total	450	100.0	100.0		.0	.0	100.0	100.0
a. Unless otherwise noted, bootstrap results are based on 10000 bootstrap samples									

Source: constructed by the researcher based on data analysis.

1: Strongly disagree. 2: Disagree. 3: Undecided 4: Agree. 5: Strongly agree.

The table above gives the frequency distribution of the students who agree or disagree the use of app for study purpose. One can observe that almost 88% of the students agree that the app can be used for study purpose. We now associate the opinions given on theusage of the app for academic purposes with students' preference to use the app for study purpose. That is we associate question 5a and question 11 (refer to final questionnaire). Again this is related to multiple options question.

Table-45

Cross tabulation between the academic activities and preference to use the app for study purpose

			Students use app for academic purpose					Total	% of Total
			Information relating to classes	Subject matters or news	Relating to entertainment and fests	Recent Trends in curriculum	Others		
Usage of the app	1	Count	6	6	6	1	2	11	2.5%
		% within usage	54.5%	54.5%	54.5%	9.1%	18.2%		
		Confidence interval	(25.12%, 83.97%)	(25.12%, 83.97%)	(25.12%, 83.97%)	(0, 26.08%)	(0, 40.97%)		
	2	Count	16	16	14	6	4	34	7.6%
		% within usage	47.1%	47.1%	41.2%	17.6%	11.8%		
		Confidence interval	(30.28%, 63.84%)	(30.28%, 63.84%)	(24.63%, 57.72%)	(4.8%, 30.46%)	(0.9%, 22.59%)		

	3	Count	4	2	3	1	1	8	1.8%
		of the app	50.0%	25.0%	37.5%	12.5%	12.5%		
		Confidence interval	(15.35%, 84.65%)	(0, 55.01%)	(0.3%, 71.05%)	(0, 35.42%)	(0, 35.42%)		
	4	Count	202	176	130	109	20	283	63.2 %
		% within usage	71.4%	62.2%	45.9%	38.5%	7.1%		
		Confidence interval	(66.11%, 76.64%)	(56.54%, 67.84%)	(40.13%, 51.74%)	(32.85%, 44.19%)	(4.08%, 10.05%)		
	5	Count	81	75	56	52	8	112	25%
		% within usage	72.3%	67.0%	50.0%	46.4%	7.1%		
		Confidence interval	(64.04%, 80.61%)	(58.25%, 75.67%)	(40.74%, 59.26%)	(37.19%, 55.66%)	(2.37%, 11.91%)		
Total		Count	309	275	209	169	35	448	100%
		% of Total	69.0%	61.4%	46.7%	37.7%	7.8%		

Source: constructed by the researcher based on data analysis.

1: Strongly disagree. 2: Disagree. 3: Undecided 4: Agree. 5: Strongly agree.

From the above table, one can observe that 88% (agree + strongly agree) of the students support the use of WhatsApp for study purpose. Among those who strongly agree to use the app for study purpose, 72.3% (81 of 112) suggest to use the app for information relating to classes, 67% (75 of 112) for subject matters or quick updates on news. Similarly, among those who agree to use the app for study purpose, 71.4% (202 of 283) support the use of app for sending information related to classes, 62.2% (176 of 283) support the use of the app for subject matters or news. That is, more preference to use the app is towards sending information relating to classes and subject matters or news. The respective probabilities can be obtained from the percentages and the confidence intervals.

Taking into consideration, the above analysis, we conclude that students of Mysore support use of WhatsApp for study purpose and suggest more the use of the app for sending information related to classes and subject matters or news. Also, they use the app more for chatting and sending images. The analysis till now helps us in noting that, students prefer the app next to a phone call during immediate communication and first among social networks. They support the use of the app for study purpose and use the app more for sending information related to classes and subject matters or news. They use the app more for chatting and sending images as compared other usages.

We now look at association between the categories of demographic characteristics, level of usage characteristics and opinion on usage of the app for academic activities and daily usage.

Table-46

Results of test for independence

	Demographic Characteristics			
	Gender	**Age**	**Education**	**Family Status**
Information related to classes	p-value=0.861 No difference	p-value=0.318 No difference	p-value=0.0001 Difference	p-value=0.759 No difference
Subject matters or quick updates on news	p-value=0.258 No difference	p-value=0.135 No difference	p-value=0.069 No difference	p-value=0.053 No difference
Entertainment and fests	p-value=0.016 Difference	p-value=0.898 No difference	p-value=0.001 Difference	p-value=0.232 No difference
Information related to curriculum	p-value=0.983 No difference	p-value=0.304 No difference	p-value=0.872 No difference	p-value=0.735 No difference
Other academic related activities	p-value=0.877 No difference	p-value=0.788 No difference	p-value=0.696 No difference	p-value=0.816 No difference
Send Images very frequently	p-value=0.181 No difference	p-value=0.169 No difference	p-value=0.0001 Difference	p-value=0.963 No difference
Sharing videos	p-value= 0.510 No difference	p-value=0.504 No difference	p-value=0.223 No difference	p-value=0.587 No difference
Sending news	p-value=0.612 No difference	p-value=0.024 Difference	p-value=0.0001 Difference	p-value=0.681 No difference
Chatting	p-value=0.593 No difference	p-value=0.103 No difference	p-value=0.0001 Difference	p-value=0.540 No difference

Source: constructed by the researcher based on data analysis.

No difference: There is no association or there is no significant difference with respect to the demographic characteristic. **Difference:** There is an association or there is significant difference with respect to the demographic characteristic.

Table-47

Results of test for association

	Level of Usage		
	Time spent	**Time since using the app**	**Number of times check status**
Information related to classes	p-value=0.226; No difference	p-value=0.007; Difference	p-value=0.142; No difference
Subject matters or quick updates on news	p-value=0.228; No difference	p-value=0.138; No difference	p-value=0.844; No difference
Entertainment and fests	p-value=0.444; No difference	p-value=0.017; Difference	p-value=0.567; No difference
Information related to curriculum	p-value=0.362; No difference	p-value=0.308; No difference	p-value=0.491; No difference
Other academic related activities	p-value=0.245; No difference	p-value=0.819; No difference	p-value=0.384; No difference
Send Images very frequently	p-value=0.042; Difference	p-value=0.0001; Difference	p-value=0.247; No difference
Sharing videos	p-value= 0.237; No difference	p-value=0.044; Difference	p-value=0.589; No difference
Sending news	p-value=0.174; No difference	p-value=0.714; No difference	p-value=0.103; No difference
Chatting	p-value=0.001; Difference	p-value=0.0001; Difference	p-value=0.482; No difference

Source: constructed by the researcher based on data analysis.

No difference: There is no association or there is no significant difference with respect to the demographic characteristic. **Difference:** There is an association or there is significant difference with respect to the demographic characteristic.

By looking at the above associations, we could find to which characteristics, the usage and is associated with. These have to be taken together if one wishes to study the usage of the app for academic activities.

Now, we look at how students feel about using the app and also their opinion on usage of Facebook, SMS etc., after started using the app. We consider specific responses given by them to question related to above mentioned aspects and present the analysis of the same, to draw valid conclusions. We use simple frequency or percentage analysis to achieve this objective. In order to achieve the above objective, we consider the following statements and opinion on the same. The codes corresponding to each of the statements indicate the questions in the questionnaire (refer to appendix).

8.2.1. Statements related to how students feel about the app

Table-48

Frequency distribution of opinions on the app

Opinion	1	2	3	4	5	Total
The app takes importance messages faster. (5c)	8(1.8%)	39(8.7%)	10(2.2%)	206(46.1%)	184(41.2%)	447
95% confidence interval for percentages	(0.56%, 3.02%)	(6.11%, 11.34%)	(0.87%, 3.61%)	(41.46%, 50.71%)	(36.60%, 45.73%)	
I spend most of the time on the app. (5d)	39(8.8)	197(44.4)	22(5.0)	133(29.4%)	53(11.7%)	444
95% confidence interval for percentages	(6.15%, 11.42%)	(39.75%, 48.99%)	(2.94%, 6.97%)	(25.69%, 34.22%)	(8.92%, 14.95%)	
It has become an important part of my life. (5f)	44(9.7%	128(28.3%)	19(4.2%)	183(40.8%)	75(16.7%)	449
95% confidence interval for percentages	(7.05%, 12.55%)	(24.33%, 32.68%)	(2.37%, 6.09%)	(36.21%, 45.30%)	(13.25%, 20.15%)	
I check status on the app very frequently. (5i)	62(13.8%)	177(39.5%)	13(2.9%)	155(34.6%)	41(9.2%)	448
95% confidence interval for percentages	(10.64%, 17.04%)	(34.94%, 44.04%)	(1.35%, 4.46%)	(30.19%, 39.00%)	(6.48%, 11.82%)	
Receiving personal information and sharing the same is easy on this app. (5m)	7(1.6%)	48(10.7%)	8(1.8%)	230(51.2%)	156(34.7%)	449
95% confidence interval for percentages	(0.41%, 2.70%)	(7.83%, 13.55%)	(0.56%, 3.01%)	(46.60%, 55.85%)	(30.34%, 39.15%)	
I came closer to my friends after using this app.(5n)	29(6.4%)	120(26.5%)	21(4.6%)	182(40.3%)	100(22.1)	452
95% confidence interval for percentages	(4.16%, 8.67%)	(22.48%, 30.62%)	(2.71%, 6.59%)	(35.74%, 44.79%)	(18.30%, 25.95%)	
I am more secure and comfortable on the app.(5k)	24(5.4%)	77(17.3%)	31(7.0%)	223(50.1%)	90(20.2%)	445
95% confidence interval for percentages	(3.29%, 7.49%)	(13.79%, 20.82%)	(4.60%, 9.33%)	(45.47%, 54.76%)	(16.49%, 23.96%)	
Conversation on the app is like talking to another person. (6c)	30(6.7%)	127(28.2%)	14(3.1%)	193(42.8%)	87(19.3%)	451
95% confidence interval for percentages	(4.35%, 8.95%)	(24.01%, 32.31%)	(1.50%, 4.70%)	(38.23%, 47.36%)	(15.65%, 22.93%)	
This app is used by me because of its simplicity and ease of use. (5l)	7(1.6%)	33(7.4)	7(1.6%)	234(52.6%	164(36.9%)	445
95% confidence interval for percentages	(0.42%, 2.73%)	(4.98%, 9.85%)	(0.42%, 2.73%)	(47.94%, 57.22%)	(32.37%, 41.34%)	

Source: constructed by the researcher based on data analysis.

1: Strongly disagree. 2: Disagree. 3: Undecided 4: Agree. 5: Strongly agree.

We now present few important points out of the table presented above. We also, give the interpretation for the respective probabilities and confidence intervals.

88% of the students support the statement that app takes the important messages faster among the friends. In terms of probability, the chances that a randomly selected student agreeing that the app takes important messages faster among the friends is 0.88 and this fluctuates between (0.8416, 0.9034). One can conclude that, this can be one of the reasons why students preferred a WhatsApp message to an SMS.

53% of the students disagreed to the statement that they spend more time on the app and 41% of them agreed to the same statement. That is, the probability of concluding that a student spends more time on the app is 0.41 and fluctuates between (0.37, 0.46). Similarly the probability that a student not spending more time the app is 0.53 and fluctuates between (0.4817, 0.5742). From these, one can conclude that the chances of a student not spending on the app more time are higher as compared to that of spending more time on the app.

57% of the students agreed that the app has become an important part of their life and 38% of them disagreed to the same statement. From this one can observe that, the chance a student accepting that the app has become important part of his/her life is 0.57 and fluctuates between (0.5289, 0.6203). The chances of disagreement are 0.38 and fluctuates between (0.3381, 0.4280). This indicates that, the probability of WhatsApp becoming an important part of a student's life are higher.

53% of the students disagreed to the statement that they check the status on the app very frequently and 43% agreed to the statement. Hence, the probability that a student not checking the app very frequently is 0.53 and fluctuates between (0.4861, 0.5784). The complimentary to this fluctuates between (0.3907, 0.4824). This indicates that the chance a student accepting that he/she check the status very frequently is less as compared to disagreement. But, one should not ignore the fact that the chances of agreement can increase to 0.4824.

86% of the students agreed that receiving personal information and sharing the same is easy on this app. In terms of probability, the chances that a randomly picked student agrees that receiving personal information and sharing the same is easy on this app is 0.86 and can fluctuate between (0.8276, 0.8918). One can note that, even if some factors affect the usage, still the chances of agreement will be more than 80%. From this one can conclude this also can be another reason why students have preferred a WhatsApp message to an SMS or an Email.

62% of the students agreed that they came closer to my friends after using the app. The chance that a student feels that he came closer after using the app is 0.62 and can fluctuate between (0.5834, 0.6728). From this one can confirm the fact that, an individual can come closer to his dear ones if he/she moves more with the groups. The chances that he/she can come closer to the dear ones using the app are above 60% i.e., the chances are high.

70% of the students agreed that they are more secured and comfortable on the app. The chance that a student feeling that he/she is more secured and comfortable on the app is 0.7, fluctuates between (0.6609, 0.7458). This can be considered as one of the major reason for students preferring a WhatsApp message than an SMS or a Facebook message.

62% of the students felt that conversation on the app is like talking to another person. The chance of a student feeling that the app is like talking to another person is 0.62 and fluctuates between (0.5761, 0.6656). Though the probability can increase to 0.66, it cannot be considered as high with respect to reasons for students preferring the app most than other means. But, can be one of the reasons.

89% of the students use the app due to its simplicity and ease use. The chances are 0.89 that a student chooses the app due to its simplicity and ease of use and the same fluctuates between (0.8658, 0.9229). This can be considered as one of the most important reasons why students are preferring the app to other means.

From the above analysis, we conclude that, the following can be considered as reasons for

students to prefer a WhatsApp message to an SMS or an Email.

a. Takes the important messages faster among the friends with probability 0.88.

b. Receiving personal information and sharing the same is easy on this app with probability 0.86.

c. More secured and comfortable on the app with probability 0.7.

d. Its simplicity and ease use with probability 0.89.

8.2.2. Statements related to other means of communication in relation with WhatsApp

Table-49

Frequency distribution of opinions on the app

	1	2	3	4	5	Total
It can be used for daily communication better than other options. (5b)	6(1.3%)	53(11.8%)	11(2.4%)	240(53.3%)	140(31.1%)	450
95% confidence interval for percentages	(0.27%, 2.39%)	(8.80%, 14.76%)	(1.02%, 3.87%)	(48.72%, 57.94%)	(26.83%, 35.39%)	
After putting the pics on WhatsApp I post less pics on the Facebook. (5g)	36(8.0%)	125(27.8%)	42(9.4%)	171(38.1%)	75(16.7%)	449
95% confidence interval for percentages	(5.49%, 10.51%)	(23.64%, 31.92%)	(6.65%, 12.02%)	(33.52%, 42.48%)	(13.22%, 20.11%)	
After started using the app, I have decreased the frequency of checking mails. (5h)	65(14.4%)	195(43.2%)	19(4.2%)	120(26.6%)	52(11.5%)	451
95% confidence interval for percentages	(11.20%, 17.69%)	(38.75%, 47.91%)	(2.36%, 6.08%)	(22.58%, 30.75%)	(8.60%, 14.51%)	
Sending an SMS is old fashion and sending messages on the app is latest. (5o)	20(4.4%)	77(17.0%)	10(2.2%)	169(37.4%)	176(38.9%)	452
95% confidence interval for percentages	(2.54%, 6.35%)	(13.63%, 20.59%)	(0.86%, 3.58%)	(33.08%, 42.03%)	(34.60%, 43.62%)	
Introduction of the Facebook on all types of mobiles will decrease the usage of the app. (6d)	30(6.7%)	127(28.2%)	14(3.1%)	193(42.8%)	87(19.3%)	451
95% confidence interval for percentages	(4.36%, 8.97%)	(24.06%, 32.38%)	(1.51%, 4.72%)	(38.32%, 47.46%)	(15.68%, 22.98%)	
WhatsApp messages reaches faster than SMS. (6e)	16(3.6%)	75(16.8%)	23(5.1%)	169(37.8%)	164(36.7%)	447
95% confidence interval for percentages	(1.84%, 5.27%)	(13.22%, 20.11%)	(3.08%, 7.15%)	(33.08%, 42.03%)	(32.00%, 40.89%)	
I think WhatsApp is better than a Facebook, Email, and a phone call. (6f)	61(13.6%)	149(33.2%)	29(6.5%)	139(31.0%)	71(15.8%)	449
95% confidence interval for percentages	(10.39%, 16.72%)	(28.76%, 37.46%)	(4.18%, 8.71%)	(26.62%, 35.16%)	(12.41%, 19.15%)	
I prefer calling facility in WhatsApp over a regular phone call. (6g)	105(23.3%)	193(42.9%)	34(7.6%)	79(17.6%)	39(8.7%)	450
95% confidence interval for percentages	(19.43%, 27.24%)	(38.42%, 47.46%)	(5.11%, 10.00%)	(14.04%, 21.07%)	(6.07%, 11.27%)	

Source: constructed by the researcher based on data analysis.

1: Strongly disagree. 2: Disagree. 3: Undecided 4: Agree. 5: Strongly agree.

84% of the students agreed (4+5) that communication is better than other options. In terms of probability, the chance that a student selected at random agrees that communication is better than other options is 0.84 and fluctuates between (0.8104, 0.8776). One can note that the chances are high and one can take this as one of the major reasons for students preferring the app for communication as compared to other means. Also since the probability is high, one can conclude that the app is being used by students for daily communication better than other options.

54% agreed that putting the pics on the app have decreased their frequency of putting the pics on Facebook. But, 35% disagreed the same. The chances that a student stopped posting pics on Facebook is 0.54 and fluctuates between (0.4939, 0.5861). Note that the chances are low and can increase to only 0.58. From this one can conclude that students still post pics on Facebook but slowly are moving towards WhatsApp.

38% of the students agreed that the frequency of checking the emails have decreased and 57% of them disagreed to the same. The chances of a student agreeing that, after starting the app he/she had decreased checking the mails is 0.38 and fluctuates between (0.3352, 0.4248). Students disagreeing the same with probability 0.57 and fluctuates between (0.5243, 0.6157). From the two one can conclude that, students' frequency of checking the mails even though they are using the app did not decrease.

76% of the students felt that sending an SMS is an old fashion and sending messages on the app is latest. The chances that students feeling that an SMS is an old fashion is 0.76 and fluctuates between (0.7206, 0.7994). This informs one that students feel that using an SMS is an old fashion to send the information. This supports the previous statements regarding the use of SMS as compared to a WhatsApp message.

62% of the students agreed to the statement that use of Facebook on all types of mobiles will decrease the usage of the WhatsApp. But, 34.9% of them disagreed to this statement. One has to seriously think on this with respect to usage of the app. The chances are only 0.349 and fluctuates between (0.3049, 0.3929). The chances of agreement fluctuates between (0.5774, 0.6670).

74% of the students agreed to the opinion that messages reaches faster through the app than SMS. In terms of probability, the chance a student agrees to the opinion that messages reaches faster through the app than SMS is 0.76 and fluctuates between (0.6993, 0.7807). Taking this along with earlier statements on SMS compared to a WhatsApp message, one can observe how famous the app is amongst the student community.

Interesting aspect is that 46% of the students agreed to the opinion that using the app is better than a Facebook, Email, and a phone call and 46% disagreed to the opinion. That is the chances of agreeing to the opinion that WhatsApp replaces the traditional methods is equally likely of not replacing the traditional methods. The chances fluctuate between (0.4206, 0.5128) for both the complimentary events.

66% of the students disagreed to the opinion that they prefer the app for calling facility to a phone call. But, 25% of students agreed to prefer the app for calling facility to a phone call. The chances fluctuate between (0.6185, 0.7059) for disagreement and chances fluctuates between (0.2216, 0.3029) for agreement.

From all the above we conclude that usage of WhatsApp affects students using an SMS for communication to a greater extent and others means like a Facebook message, an Email to some extent.

8.3 Opinion of students on introducing the free Wi-Fi facility in relation to usage of the app, using the app by women for their safety and police adopting the app for protecting women

In this section, we look at the agreement or disagreement of the students towards introducing the free Wi-Fi facility by the government and its effect on growth of WhatsApp. The motivation to study this is the recent proposal of the Karnataka government of free Wi-Fi38, 39, 40. It is a natural assumption that if the internet facility is available for free then the usage of the app may increase and also the number of users who prefer to use the app may also increase. The following tables gives the details of students related to free Wi-Fi, women safety, and police using the app for women safety. They are all frequency distribution tables and using these we try to check the objective.

Table-50

Frequency distribution of students on Free Wi-Fi

Q6h									
		Frequency	Percent	Valid Percent	Cumulative Percent	Bootstrap for Percenta			
						Bias	Std. Error	95% Confidence Interval	
								Lower	Upper
Ranks	1	27	6.0	6.0	6.0	.0	1.1	4.0	8.3
	2	67	15.0	15.0	21.0	.0	1.7	11.8	18.3
	3	19	4.2	4.2	25.2	.0	1.0	2.5	6.3
	4	201	44.9	**44.9**	70.1	.0	2.3	40.2	49.3
	5	134	29.9	**29.9**	100.0	.0	2.1	25.7	34.2
	Total	448	100.0	100.0		.0	.0	100.0	100.0
a. Unless otherwise noted, bootstrap results are based on 10000 bootstrap samples									

Source: constructed by the researcher based on data analysis.

From the above table, one can observe that almost 75% of the students are supporting to have a free Wi-Fi so that it improves the communication between the members of society. In terms of probability, the chance that a student supports a free Wi-Fi is 0.75 and it fluctuates between (0.7099, 0.7901). From this we conclude that students support the government's decision on introducing free Wi-Fi.

Table-51

Frequency distribution of students on more people using the app after free Wi-Fi

Q6i									
		Frequency	Percent	Valid Percent	Cumulative Percent	Bootstrap for Percenta			
						Bias	Std. Error	95% Confidence Interval	
								Lower	Upper
Ranks	1	29	6.5	6.5	6.5	.0	1.2	4.3	8.7
	2	46	10.3	10.3	16.8	.0	1.5	7.6	13.2
	3	24	5.4	5.4	22.2	.0	1.1	3.4	7.6
	4	165	37.0	37.0	59.2	.0	2.3	32.7	41.5
	5	182	40.8	40.8	100.0	.0	2.3	36.3	45.3
	Total	446	100.0	100.0		.0	.0	100.0	100.0
a. Unless otherwise noted, bootstrap results are based on 10000 bootstrap samples									

Source: constructed by the researcher based on data analysis.

The above statistics indicate that 77.8% of the students agree that free Wi-Fi will make more people use WhatsApp. The probability that a student thinks that introduction of free Wi-Fi will increase the number of users is 0.778 and fluctuates between (0.7394, 0.8166).

Table-52

Frequency distribution of the students on Wi-Fi and Women safety

Q6j									
		Frequency	Percent	Valid Percent	Cumulative Percent	Bootstrap for Percenta			
						Bias	Std. Error	95% Confidence Interval	
								Lower	Upper
Ranks	1	30	6.7	6.7	6.7	.0	1.2	4.5	9.2
	2	59	13.2	13.2	20.0	.0	1.6	10.3	16.4
	3	16	3.6	3.6	23.5	.0	.9	2.0	5.4
	4	187	41.9	41.9	65.5	.0	2.3	37.4	46.4
	5	154	34.5	34.5	100.0	.0	2.3	30.0	39.0
	Total	446	100.0	100.0		.0	.0	100.0	100.0

Source: constructed by the researcher based on data analysis

One can note from the above table that 75% of the students agree that due to free Wi-Fi women can use WhatsApp for their safety, by giving quick messages to their friends. This indicates that with a probability of 0.75 a student supports women using the app for their safety due to free Wi-Fi and it fluctuates between (0.7098, 0.7902) in the population.

Table-53

Frequency distribution of students on police using the App

Q6k									
		Frequency	Percent	Valid Percent	Cumulative Percent	Bootstrap for Percent[a]			
						Bias	Std. Error	95% Confidence Interval	
								Lower	Upper
Ranks	1	30	6.7	6.7	6.7	.0	1.2	4.5	9.2
	2	59	13.2	13.2	20.0	.0	1.6	10.1	16.4
	3	20	4.5	4.5	24.4	.0	1.0	2.7	6.5
	4	193	43.3	43.3	67.7	.0	2.4	38.8	48.0
	5	144	32.3	32.3	100.0	-.1	2.2	27.8	36.5
	Total	446	100.0	100.0		.0	.0	100.0	100.0
a. Unless otherwise noted, bootstrap results are based on 10000 bootstrap samples									

Source: constructed by the researcher based on data analysis.

One can note from the above table that 75% of the students agree that police can use the app for protecting women. This indicates that with a probability of 0.75 a student supports police using the app for women safety and it fluctuates between (0.7098, 0.7902) in the population.

We hence draw the conclusion that most of the students support the plan of the government to introduce free Wi-Fi, feels that introduction of free Wi-Fi will increase the use of the app and also improves the communication between the members of society. Also, they support police and women using the app for the safety of the women.

We now use the correspondence analysis to find the closeness in the opinion of the students with respect to above mentioned aspects related to introduction of Wi-Fi, usage of app for women safety. It helps us to find out the closeness of the categories (strongly agree to strongly disagree) with respect to students supporting the Wi-Fi and their opinion of usage of the app.

8.3.1. Association between support to Wi-Fi and opinion of more people using the app

Table-54

Cross tabulation of the opinions

			Q6i					Total
			1	2	3	4	5	
Q6h	1	Count	15	5	1	5	1	27
		% within Q6h	55.6%	18.5%	3.7%	18.5%	3.7%	100.0%
		% within Q6i	50.0%	10.9%	4.2%	3.0%	0.5%	6.0%
	2	Count	7	19	3	22	16	67
		% within Q6h	10.4%	28.4%	4.5%	32.8%	23.9%	100.0%
		% within Q6i	23.3%	41.3%	12.5%	13.4%	8.7%	15.0%
	3	Count	2	2	11	3	1	19
		% within Q6h	10.5%	10.5%	57.9%	15.8%	5.3%	100.0%
		% within Q6i	6.7%	4.3%	45.8%	1.8%	0.5%	4.3%
	4	Count	3	13	8	108	68	200
		% within Q6h	1.5%	6.5%	4.0%	54.0%	34.0%	100.0%
		% within Q6i	10.0%	28.3%	33.3%	65.9%	37.2%	44.7%
	5	Count	3	7	1	26	97	134
		% within Q6h	2.2%	5.2%	0.7%	19.4%	72.4%	100.0%
		% within Q6i	10.0%	15.2%	4.2%	15.9%	53.0%	30.0%
Total		Count	30	46	24	164	183	447
		% within Q6h	6.7%	10.3%	5.4%	36.7%	40.9%	100.0%
		% within Q6i	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: constructed by the researcher based on data analysis.

1: Strongly disagree. 2: Disagree. 3: Undecided 4: Agree. 5: Strongly agree.

Table-55

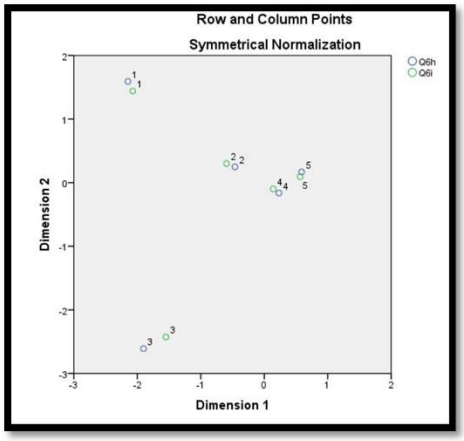
Summary

Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	Standard Deviation	Correlation 2
1	.592	.350			.475	.475	.047	.402
2	.472	.223			.302	.777	.082	
3	.343	.118			.160	.937		
4	.215	.046			.063	1.000		
Total		.738	329.690	.0001	1.000	1.000		

Source: constructed by the researcher based on data analysis.

From the above table note that the association between the two attributes is significant (p-value=0.001 <alpha).

Graph-13



Source: constructed by the researcher based on data analysis.

From the above graph, one can note that there is strong association between the categories of students supporting government's decision is strongly associated with their opinion on more people using the app. This indicates that students supporting the introduction of Wi-Fi and their opinion on increase in the number of WhatsApp users move in the same direction. That is students' strong agreement of introducing free Wi-Fi goes with students' strong agreement that the user base will increase due to free Wi-Fi. Similarly, their strong disagreement of introducing free Wi-Fi goes with students' strong disagreement that the user base will increase due to free Wi-Fi. The same can be seen on the graph. The degree of association is 0.460 and the corresponding p-value (0.0001) indicates that the association is significant.

8.3.2. Support to Wi-Fi and Women using the app for their safety

Table-56

Cross tabulation of the opinions

			Q6j					Total
			1	2	3	4	5	
Q6h	1	Count	10	10	0	6	1	27
		% within Q6h	37.0%	37.0%	0.0%	22.2%	3.7%	100.0%
		% within Q6j	34.5%	16.7%	0.0%	3.2%	0.6%	6.1%
	2	Count	8	17	2	28	11	66
		% within Q6h	12.1%	25.8%	3.0%	42.4%	16.7%	100.0%
		% within Q6j	27.6%	28.3%	11.8%	15.1%	7.1%	14.8%
	3	Count	6	2	5	5	1	19
		% within Q6h	31.6%	10.5%	26.3%	26.3%	5.3%	100.0%
		% within Q6j	20.7%	3.3%	29.4%	2.7%	0.6%	4.3%
	4	Count	1	21	6	117	55	200
		% within Q6h	0.5%	10.5%	3.0%	58.5%	27.5%	100.0%
		% within Q6j	3.4%	35.0%	35.3%	62.9%	35.7%	44.8%
	5	Count	4	10	4	30	86	134
		% within Q6h	3.0%	7.5%	3.0%	22.4%	64.2%	100.0%
		% within Q6j	13.8%	16.7%	23.5%	16.1%	55.8%	30.0%

Source: constructed by the researcher based on data analysis.

1: Strongly disagree. 2: Disagree. 3: Undecided 4: Agree. 5: Strongly agree.

Table-57

Summary of the analysis

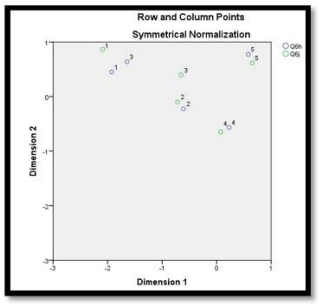
Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	Standard Deviation	Correlation 2
1	.519	.269			.575	.575	.047	.211
2	.361	.130			.278	.853	.043	
3	.256	.066			.140	.993		
4	.057	.003			.007	1.000		
Total		.468	208.756	.0001	1.000	1.000		

Source: constructed by the researcher based on data analysis

The association between the two attributes is significant and the two dimensions extracted explains 85% of the variation. The following graph gives the association.

From the above graph, note that the categories of both the attributes move in same direction and the association is also good. The degree of association is 0.418 and is significant (p-value is 0.0001).

Graph-14



Source: constructed by the researcher based on data analysis

8.3.3. Support to Wi-Fi and opinion on police using the app for women safety

Table-58

Cross tabulation of opinions

			Q6k					Total
			1	2	3	4	5	
Q6h	1	Count	12	7	1	5	2	27
		% within Q6h	44.4%	25.9%	3.7%	18.5%	7.4%	100.0%
		% within Q6k	40.0%	11.9%	5.0%	2.6%	1.4%	6.1%
	2	Count	5	20	2	25	15	67
		% within Q6h	7.5%	29.9%	3.0%	37.3%	22.4%	100.0%
		% within Q6k	16.7%	33.9%	10.0%	13.1%	10.4%	15.1%
	3	Count	5	3	6	3	2	19
		% within Q6h	26.3%	15.8%	31.6%	15.8%	10.5%	100.0%
		% within Q6k	16.7%	5.1%	30.0%	1.6%	1.4%	4.3%
	4	Count	1	21	9	114	53	198
		% within Q6h	0.5%	10.6%	4.5%	57.6%	26.8%	100.0%
		% within Q6k	3.3%	35.6%	45.0%	59.7%	36.8%	44.6%
	5	Count	7	8	2	44	72	133
		% within Q6h	5.3%	6.0%	1.5%	33.1%	54.1%	100.0%
		% within Q6k	23.3%	13.6%	10.0%	23.0%	50.0%	30.0%
Total		Count	30	59	20	191	144	444
		% within Q6h	6.8%	13.3%	4.5%	43.0%	32.4%	100.0%
		% within Q6k	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: constructed by the researcher based on data analysis.

1: Strongly disagree. 2: Disagree. 3: Undecided 4: Agree. 5: Strongly agree.

Table-59

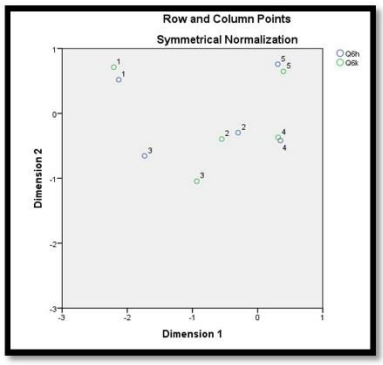
Summary of the analysis

Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	Standard Deviation	Correlation 2
1	.502	.252			.593	.593	.057	.032
2	.298	.089			.210	.802	.046	
3	.250	.062			.147	.949		
4	.147	.021			.051	1.000		
Total		.425	188.688	.0001	1.000	1.000		

Source: constructed by the researcher based on data analysis.

One can note that the association is again significant and the following graph gives the association between the categories of the two attributes.

Graph-15



Source: constructed by the researcher based on data analysis.

The graph reveals a moderate association between the categories of the two attributes. This indicates that students wish that women can use WhatsApp for their safety. One can see that the closeness of strong agreement between the two attributes. The degree of association is 0.349 and the corresponding p-value is 0.0001.

We now look at the association between the women using the app for safety and police adopting the app for women safety.

8.3.4. Support to police using the app and women using the app

Table-60

Cross tabulation of the opinions

			Q6k					Total
			1	2	3	4	5	
Q6j	1	Count	15	9	2	1	3	30
		% within Q6j	50.0%	30.0%	6.7%	3.3%	10.0%	100.0%
		% within Q6k	50.0%	15.3%	10.0%	0.5%	2.1%	6.7%
	2	Count	7	23	2	16	11	59
		% within Q6j	11.9%	39.0%	3.4%	27.1%	18.6%	100.0%
		% within Q6k	23.3%	39.0%	10.0%	8.3%	7.6%	13.2%
	3	Count	1	0	7	4	4	16
		% within Q6j	6.2%	0.0%	43.8%	25.0%	25.0%	100.0%
		% within Q6k	3.3%	0.0%	35.0%	2.1%	2.8%	3.6%
	4	Count	5	17	7	127	31	187
		% within Q6j	2.7%	9.1%	3.7%	67.9%	16.6%	100.0%
		% within Q6k	16.7%	28.8%	35.0%	65.8%	21.4%	41.8%
	5	Count	2	10	2	45	96	155
		% within Q6j	1.3%	6.5%	1.3%	29.0%	61.9%	100.0%
		% within Q6k	6.7%	16.9%	10.0%	23.3%	66.2%	34.7%
Total		Count	30	59	20	193	145	447
		% within Q6j	6.7%	13.2%	4.5%	43.2%	32.4%	100.0%
		% within Q6k	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: constructed by the researcher based on data analysis.

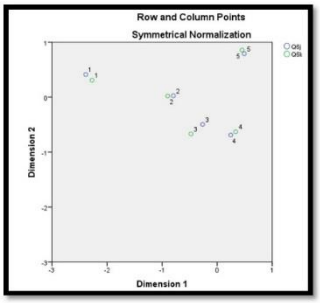
Table-61

Summary of the analysis

Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	Standard Deviation	Correlation 2
1	.578	.334			.472	.472	.050	.102
2	.436	.190			.268	.740	.044	
3	.371	.137			.194	.934		
4	.216	.047			.066	1.000		
Total		.709	316.721	.0001a	1.000	1.000		

Source: constructed by the researcher based on data analysis.

One can note the significance of association between the students' opinion of police using the app for safety of the women and women also using it for their safety.



Graph-16

Source: constructed by the researcher based on data analysis.

From the above graph, one can observe that there is strong association between opinion of women using the app and police using the app for women safety. The degree of association is 0.472 and is significant (p-value is 0.0001).

Till now whatever we have presented is with respect to overall perspective of the students on women using the app and police supporting the same. But, one can question on the women's opinion on the same. We hence look at particularly from female students' point of view and try to find the associations.

8.3.5. Female supporting the use of app for their safety in association with police

Table-62

Cross tabulation of opinions

			Q6k					Total
			1	2	3	4	5	
Q6j	1	Count	5	2	0	0	1	8
		% within Q6j	62.5%	25.0%	0.0%	0.0%	12.5%	100.0%
		% within Q6k	45.5%	7.7%	0.0%	0.0%	1.7%	4.3%
	2	Count	2	12	0	7	2	23
		% within Q6j	8.7%	52.2%	0.0%	30.4%	8.7%	100.0%
		% within Q6k	18.2%	46.2%	0.0%	8.6%	3.4%	12.5%
	3	Count	0	0	2	1	1	4
		% within Q6j	0.0%	0.0%	50.0%	25.0%	25.0%	100.0%
		% within Q6k	0.0%	0.0%	28.6%	1.2%	1.7%	2.2%
	4	Count	3	7	4	54	9	77
		% within Q6j	3.9%	9.1%	5.2%	70.1%	11.7%	100.0%
		% within Q6k	27.3%	26.9%	57.1%	66.7%	15.3%	41.8%
	5	Count	1	5	1	19	46	72
		% within Q6j	1.4%	6.9%	1.4%	26.4%	63.9%	100.0%
		% within Q6k	9.1%	19.2%	14.3%	23.5%	78.0%	39.1%
Total		Count	11	26	7	81	59	184
		% within Q6j	6.0%	14.1%	3.8%	44.0%	32.1%	100.0%
		% within Q6k	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: constructed by the researcher based on data analysis.

Table-63

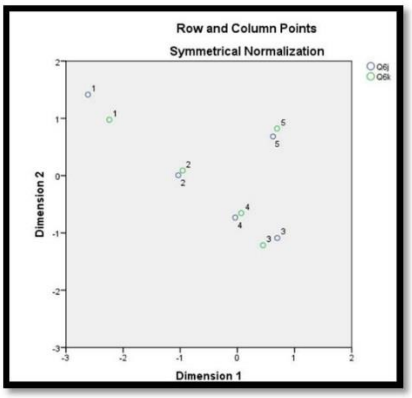
Summary of the analysis

Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	Standard Deviation	Correlation 2
1	.594	.353			.406	.406	.077	.283
2	.520	.270			.311	.717	.061	
3	.383	.147			.169	.886		
4	.314	.099			.114	1.000		
Total		.868	159.758	.0001	1.000	1.000		

Source: constructed by the researcher based on data analysis.

The Chi-square value indicates the significance of the association. The closeness between the categories of the two attributes is presented in the following graph.

Graph-17



Source: constructed by the researcher based on data analysis.

From the above graph one can note that there is a strong association between the categories of the two attributes. One can see the closeness of the categories with respect to either agreement or disagreement. The degree of association between the two is 0.522 and the corresponding p- value is 0.0001.

From the above analysis we conclude that students support the use of WhatsApp for women safety in association with free Wi-Fi and police using the app for women safety.

We now test the association between the demographic characteristics and support to free Wi- Fi and women safety, test associations with respect to level of usage characteristics.

Null hypothesis: The support to free Wi-Fi is independent on either demographic characteristics or level of usage characteristics.

Alternative hypothesis: The support to free Wi-Fi is dependent on either demographic characteristics or level of usage characteristics.

We use Chi-square test for independence of attributes to address this objective.

Table-64

Results of Chi-square analysis

Opinion / Characteristic	Support free Wi-Fi	Free Wi-Fi and more users	Free Wi-Fi and women using app for their safety	Free Wi-Fi and police using app for women safety
Gender	p-value=0.585 No difference	p-value=0.216 No difference	p-value=0.268 No difference	p-value=0.946 No difference
Education Qualification	p-value=0.0001 Difference	p-value=0.0001 Difference	p-value=0.0001 Difference	p-value=0.0001 Difference
Family Status	p-value=0.359 No difference	p-value=0.941 No difference	p-value=0.223 No difference	p-value=0.270 No difference
Average time spent on the app	p-value=0.664 No difference	p-value=0.646 No difference	p-value=0.254 No difference	p-value=0.288 No difference
Time since using the app	p-value=0.926 No difference	p-value=0.085 No difference	p-value=0.215 No difference	p-value=0.172 No difference
Number of times check the status	p-value=0.002 Difference	p-value=0.291 No difference	p-value=0.018 Difference	p-value=0.021 Difference

Source: constructed by the researcher based on data analysis.

No difference: There is no association or there is no significant difference with respect to the demographic characteristic.

Difference: There is an association or there is significant difference with respect to the demographic characteristic.

Some important points based on the above analysis

From the above analysis, one can note that 75% of the students support the introduction of free Wi-Fi and 77% of the students agree that free Wi-Fi will increase the number of users. That is, because of free Wi-Fi more people tend to use the app. 75% of the students support that due to free Wi-Fi women can comfortably use the app for their safety. 75% of the students support police using the app for women safety. Now the interesting part will be the associations between the above mentioned variables. The correlation between students supporting free Wi- Fi and opinion and more people using the app due to this is positive (0.460) and significant. The correlation between the students supporting free Wi-Fi and women using the app for their safety is positive (0.418) and significant. Also the correlations between the students supporting police and women using the app for women safety are positive and significant. Even women alone supporting the use of the app for their safety is positive and significant.

From the above one can conclude that introduction of free Wi-Fi will increase the number of users and also makes women and police use the app for women safety.

From our previous analysis we have noted that students have supported the introduction of free Wi-Fi, women using the app due to free Wi-Fi, and police using the app for women safety after introducing the free Wi-Fi. Now the question is "Did any of the demographic or level of usage characteristics have influenced them to prefer this or the preference is independent of these characteristics"? The above analysis has revealed that there is not much influence of the gender, family status, average time spent, and time since using the app on the support for free Wi-Fi and using the same for women safety. But, Educational qualification has a highly significant association with support to free Wi-Fi and using the app for women safety. This indicates that there is difference between the graduate and post-graduate students with respect to their opinion on introducing free Wi-Fi and using the app for women safety. Now, the interesting study would be on reasons form this difference and can be taken up as a continuation of our current work. Another aspect is that there is an association between number of times one check the status and support to free Wi-Fi, women using the app due to free Wi-Fi and police using the app for women safety. This indicates that number of times one checks the status may influence the support to free Wi-Fi. This is very obvious as one who checks the status more number of times will support to have a free Wi-Fi.

8.4. To identify the factors that motivate students prefer the usage of WhatsApp for communication.

In this section, we use factor analysis to explore the factors that students consider as important with respect to usage of the WhatsApp. The following tables gives the details of the factor analysis. The variables considered in the analysis have been coded and the details of the codes have been given in appendix. Under this we consider all the categories as one and we have 28 variables measured to understand the perception of the students on the usage of the app.

The first question one should ask while conducting factor analysis is the sufficiency of the sample size. The Kaiser-Meyer-Olkin (KMO) criterion is widely used to check whether the sample size considered is adequate to conduct the factor analysis. A value of KMO above 0.5 is desired to conclude that the sample size is adequate. The second question one should ask is whether the correlations between the variables considered in the study are significant. Bartlett's test for Sphericity is used to test this hypothesis. Chi-square test statistic has to give a p-value less than the level of significance to conclude that the correlation matrix is not an identity matrix. If the test do not reject the null hypothesis that the correlation matrix is an identity matrix, then one has to conclude that the variables considered do not have significant commonality between them and factor analysis need not be used.

The following table gives the results of KMO and Bartlett's test for the study.

Table-65

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.756
Bartlett's Test of Sphericity	Approx. Chi-Square	1864.439
	Df	300
	Sig.	.000

Source: constructed by the researcher based on data analysis.

From the above table one can conclude that the sample is adequate to conduct the factor analysis and also the correlation matrix is not an identity matrix.

Another important aspect related to factor analysis is the variance in each variable extracted by the factors extracted. In other words the amount of change that the factors extracted can explain as a whole with resp3ect to each of the variables. This is observed by looking at the communalities and the desired value has to be at least 0.5 in general. But, sometimes, one can consider a value at least close to 0.5 (ranging between 0.4 and 0.5). A communality value lower than this indicates that factors could not explain the change in that variable and the relation between the factors and variable is low and hence the variable has to be ignored from the analysis. Table-69 in appendix gives the communalities.

Note that the communalities corresponding to Q5c, Q5m, and Q6c, are low and the minimum happens to be Q6c. Q6c happens to be the item defined as "conversation on the app is like talking to another person. A low communality indicates that the factors extracted can only explain lower percent of variation and also has got low correlation with other variables. Hence, we ignore this from the analysis and similarly other variables have been ignored based on similar argument. But, Q5c has not been ignored as the communality of the same has been increased after ignoring those variables that have less correlation with it. Table-70 in appendix-3 gives the communalities of the modified analysis.

Once the communalities are at the desired levels, one has to look at the total variance of the system of original variables explained by the set of factors that have been extracted. This is very important as it indicates whether the set of factors considered are sufficient to explain the entire system of variables. A low variance indicates that the factors considered cannot explain the system properly. A minimum of 60% is desired. One criteria to select the factors is based on the Eigen values, which are the variances of individual factors. Select those factors whose Eigen values are at least 1. Sometimes based on the study, one can also select the factors with Eigen values at least 0.9. The table-71 in appendix-3 gives the variance explained by the factors and the number of factors of the study. Note that, once the factors have been identified, they have to be appropriately named in relation to the study.

From the table, one can note that, 61% of the total variance can be explained from nine components (factors). Only those components whose Eigen values are more than one are considered. Using these nine components, one can study the view points of the students with respect to their usage and also their opinion on how the app has changed their usage with respect to other means of communication (Facebook, phone call, SMS etc.). Also, from Kaiser- Maier-Oilkin test and Bartlett test for sphericity one can note that the sample is adequate to conduct the analysis and the correlations between the variables are significant.

In factor analysis, the components of factors extracted will have correlations with the variables of the original system. Sometimes, the direction in which the latent factors move and the direction in which the data move will be different. In such cases, one uses rotation techniques so that the factors move in the same direction as the variables move. Hence, in factor analysis one has to consider the rotated component matrix for proper interpretation. The values in the rotated component matrix are called as factor loadings and they give the correlations between the variables and the factors extracted. Table-72 in appendix-3 gives the factor loadings of the system of variables considered in the analysis. The values in table-72 are the factor loadings and the variables whose factor loadings are close to 0.5 or at least 0.5 are grouped into components. Using the factor loadings, each variable can be re-written in terms of the components extracted by the analysis. Since 61% of the variation can be explained by nine components, the change in the entire system of variables can be explained to that extent. The variance in each variable

explained can be noted from the communalities and this is one of the reason why variables with lower communalities (usually less than 0.5) will not be considered in the analysis. This is because of the reason that the commonalities of that variable in association with other variable could not be explained by the factors appropriately. Now, one needs to take combination of variables in each component and based on their definition, the components have to be named appropriately. Table-73 in appendix-3 gives the list of variables grouped and the component names. The next table gives the variables considered under each factor.

Table-66

Factors and variables associated

Factor Variables	1	2	3	4	5
Accessibility and safety	Stronger networks	Free Wi-Fi improves communication	More people use the app due to free Wi-Fi	Women safety increases due to free Wi-Fi	Police using the app for protecting women
Flexibility and ease in usage	Used for better communication	Important part of the life	Simple and easy to use	Aware and using the app from long	
Preference of usage	Spent most time on the app as it is interesting	Check status very frequently	Use the app for calling		
Quick communication	Takes messages faster	Secure and comfortable	Information about meetings is	Messages reach faster than SMS	
Better means of communication	Introducing Facebook on mobile will decrease usage of the app	WhatsApp is better than other means			
Latest and comfortable	Came closer to friends	Latest in sending messages			
Useful academic tool	Used for study purpose	Teacher also have to use the app and join the			
Frequency of usage	Posting the pics on the app decrease posting the on Facebook	Using the app decreased the frequency of checking mails			
My friends choice	Using the app on suggestion from friends				

Source: constructed by the researcher based on data analysis.

The above table gives the factors and the corresponding variables under each factor. One can interpret the factors and draw appropriate conclusions.

The next and the final step or ultimate purpose of the factor analysis is to generate factor scores for each of the respondent. These factor scores are the values that denote the calculated responses to each of the factors and can be used for further analysis. They are calculated by multiplying the factor loadings to each variable with the responses given to that variables by the respondents in the questionnaire. In this study regression method is used to calculate the factor scores. Table-74 in appendix-3 gives the sample of the factor scores calculated on the nine factors extracted. These values can be used for further analysis. The following table gives the descriptive statistics for the factor scores. Using these, we rank the factors and this will give one to note the order in the factors responsible for one to choose WhatsApp for communication. The factor scores will be used to fit an ordinal logistic regression model that will be used to predict the ranking of app and the same will be discussed in later sections. Note that the calculations are done after considering the absolute values of the factor scores. This is to ensure that the averages will not be zero. A factor score consists of two parts: one the sign and second the magnitude. The sign indicates the direction in which the respondent is moving with respect to that factor and the magnitude indicates the strength. Since, we are looking at the overall score of the factor, the sign is ignored and only the magnitude is considered.

Table-67

Factor	N	Minimum	Maximum	Mean	Std. Deviation	C.V	Skewness	Kurtosis
Accessibility and safety	397	0	3.14	0.7555	0.65708	0.86972866	1.564	2.465
Flexibility and ease in usage	397	0	4.08	0.7785	0.62966	0.80881182	1.465	3.076
Preference of usage	397	0	2.83	0.7967	0.59265	0.74388101	0.819	0.21
Quick communication	397	0	3.81	0.7637	0.64453	0.84395705	1.801	4.18
Better means of communication	397	0	2.83	0.821	0.56971	0.69392205	0.713	0.008
Latest and comfortable	397	0	2.79	0.7964	0.60452	0.7590658	0.966	0.598
Useful academic tool	397	0	3.48	0.7712	0.63761	0.82677645	1.357	2.181
Frequency of usage	397	0	3.05	0.8067	0.57233	0.70947068	0.847	0.285
My friends choice	397	0.01	2.82	0.8432	0.53322	0.63237666	0.576	0.07

Source: constructed by the researcher based on data analysis.

Table-68

Ranking of the factors

Factor	Rank
My friends choice	**1**
Better means of communication	**2**
Preference of usage	**3**
Frequency of usage	**4**
Latest and comfortable	**5**
Useful academic tool	**6**
Flexibility and ease in usage	**7**
Accessibility and safety	**8**
Quick communication	**9**

Source: constructed by the researcher based on data analysis.

From the above table, one can note that choosing the app due to the influence of the friends is in rank 1 and the accessibility and safety is the last rank. This can be used by one to understand the reasons, in priority, for using the app for communication. Note that, the ranking is given based on C.V. (Coefficient of variation).

9. Conclusion

From the entire analysis and discussions presented in the previous chapters, we finally conclude the study and simultaneously answer the research questions raised.

The motivation for considering the study is twofold. The first one is with respect to how far students support using the app for academic related activities and the second is with respect to how far students agree that the usage of the app decreases the usage of traditional means of communication. Also, the motivation is to look if there exists differences between categories of demographic and level of usage characteristics. The demographic characteristics include gender, educational qualification, and family status. The level of usage characteristics include average time a student spends on the app, time since a student is using the app, and average number of times a student checks the status on the app, per day.

The questionnaire used for collecting the responses related to the usage of the app has a reliability value more than 0.75, which is considered as acceptable. The sample is collected using a non-probability sampling design. The sample satisfies the property of randomness and hence is used to draw inferences in terms of probability.

From the analysis related to preferences to the traditional means other than WhatsApp, we conclude that a phone call is preferred most (82.6% of students) and a Facebook message is preferred last (22.1%). The preference to a phone call differed significantly with respect to categories of educational qualification. That is, the graduates and post-graduates have difference perception towards the use of a phone call other than a WhatsApp message, for regular communication.

The analysis on preference to a WhatsApp message as compared to other traditional means, revealed that a phone call is preferred most even in the presence of a WhatsApp message. From this we conclude that, though a WhatsApp message is available for regular communication, students preferred to use a phone call for regular communication more frequently. An SMS is preferred by only 6.6% of the students and majority of them feel that sending message using WhatsApp is latest. From this we conclude that majority of the students prefer a WhatsApp message to an SMS for shorter communication and a phone call for longer communication. Gender did not have difference with respect to preference to a WhatsApp message whereas there exists significant difference between the preferences to WhatsApp message with respect to a family status. The average time a student spends on the app, time since a student using the app have significant associations with preference to a WhatsApp message and average number of times a student checks the status on the app has no significant association with preference to a WhatsApp message. From this we conclude that if one is drawing conclusions with respect to preference to a WhatsApp, these characteristics have to be taken together with preference. The analysis on preference to WhatsApp among the social networks revealed that WhatsApp is preferred to other means for communication on social media. Moderate, but significant associations exists between preference to other means and preference to WhatsApp. With respect to preference to WhatsApp among the social networks, gender, educational qualification have significant difference among their categories. That is male and female differ with respect to preferences to WhatsApp and also graduates and post-graduates have a different perception towards preference to WhatsApp.

From the above we conclude that among the traditional means for regular communication, a WhatsApp message is preferred second to a phone call. But, among the social networks WhatsApp is preferred most. This indicates that the app is preferred most for communication on social media but nor for regular communication.

From the analysis on students supporting the usage of the app for academic activities, we conclude that students so support the usage of the app for academic activities. Among the several activities they preferred to use the app most for sending information related to classes followed by sending information related to subject matters or quick updates on news. Among the general usage options, students preferred to use the app for chatting most followed by sending images, sending general news and other related information. From this we conclude that students prefer to use the app for academic activities.

Most of the students feel that the app is preferred because it takes information faster among friends, receiving and sharing personal is easy, more secured

and comfortable to use, and simple and easy to use. Also, most of the students feel that communication is better than other options with respect to shorter communication. Most of them feel that sending information using the app is latest and sending through an SMS is old fashion. More than students felt that posting pics of on the app will decrease posting pics on Facebook. But, they agreed that if Facebook is available on all types of mobiles then the usage of the app may decrease. They disagreed to the statement that calling facility in the app will decrease the use of a phone call. From all these, we conclude that with respect to specific usage options, the app is better than traditional means. Especially it will replace an SMS completely in future. The association between spending time on the app and the app becoming important part of the life, is significant. This indicates that the app becomes very important if one uses the app for more time. Students also agreed significantly that, because of receiving and sharing the information easily using the app they have come closer to friends. They also agreed that because they came closer due to the app, they feel more secured and comfortable. Also, feel that networking can be strengthened and built because the app takes important messages faster. From the above we conclude that the usage of the app has significantly affected the usage of traditional methods.

Students strongly supported the government's decision of introducing free Wi-Fi into the society. They agreed that due to free Wi-Fi, the users for the app will increase significantly. Also, they felt strongly that if free Wi-Fi is available, then women can use the app for their safety and supported strongly that police also should use the app for women safety. The opinion on free Wi-Fi, women using the app, and police using the app for women safety differed significantly with respect to educational qualification. From this we conclude that government should introduce free Wi-Fi so that more users use WhatsApp for communication and also women and police can use the app for women safety.

Finally, we have identified the factors responsible for a student choosing the app to other means. The students choose the app because their friends have started using the app and they received motivation from their friends to use the app. They feel that the app is better means of communication, frequency of usage, preference of usage, latest and comfortable, flexible and easy to use, useful academic tool, useful for quick communication, and the last one is accessibility and safety. We finally conclude that the use of WhatsApp has significantly affected other means of communication and also is being preferred by the students with respect to academic activities.

10. Limitations and Future work

As every/any research has limitations, out study also have few limitations. We list the same one after the other.

1. The study has been confined to only Mysore and also to only undergraduate and Post- graduate students of Mysore. Hence, the generalizations are valid to only these group of students. If one wishes to generalize the results to students of Mysore, then one has to include different classes in the study.
2. The viewpoints have been taken from the student community and few observations relating to the usage of the app have been noted. One cannot generalize few inferences to other sections of the society. If one wishes to do the same then, representation has to be from different sections of the society.
3. The results of the study cannot be generalized to students in India. If one wishes to conclude with respect to students in India then, one has to extend the study by taking representation from different parts of India.
4. The questionnaire constructed can be used as a metric to measure the perception of only one section of the students in Mysore. If the metric has to be a standard metric, then one has to test for its consistency across other sections of students and representation has to be from different parts of India.
5. The study looked at only the usage of the WhatsApp but do not compare much with the usage of Facebook in particular. One can think of comparing both the usages and draw inferences on usage of the app in connection to usage of Facebook in detail.
6. One has to think of proposing a model that can determine the preference level of the usage of

the app. The present study did not include modelling of preference and one can take up the same as future work.

7. The current study is an exploratory study that looked at how students perceive the usage of the app for difference academic related activities and how do students feel about the app, in relation with its general usage. One can also include those questions related to emotional side of the app like how the app brought their dear one closer to them and how they could form teams easily and so on.

The above mentioned points are some of the limitations as well as suggestions for further research.

11. Research Student's personal experience on the project- Mr. Siby Yohannan

Experience in using WhatsApp : I personally started using WhatsApp 2 years ago when my friend told me that without WhatsApp I will not be able to get in touch with my close friends and since then started using it. I also felt that my friend is right and I even changed my mobile phone to use the app. At that time I never thought why he cautioned me about its usage. After I got the opportunity to do research at SDM IMD, I started thinking why people are deeply attracted towards this particular app. One reason I could think of, is the influence of referrals and I also felt that there are other reasons, which are latent, behind why people started using this mobile app.

I preferred using the app because it is more compact than any other apps of its kind, user friendly, attractive and no ads on it. Only those who knew me can contact me. So I felt it's safer and user friendly and moreover I felt that I was using the app for chatting. Whereas on Facebook I spend time to watch profiles of my friends and for commenting their posts which were posted on their profiles.

During my course in management, WhatsApp had really helped me in forming groups, conduct group activities and communicate to my group members about the latest development in the projects, in which we are working. I knew that there are many other platforms available similar to WhatsApp. But, I never thought about forming a group using those apps. Because of the simplicity of the app I even thought about changing my mobile phone. WhatsApp changed the way in which I used to communicate with people and, I have started receiving professional messages through the WhatsApp.

When I started searching on the internet more about the app, I came to know that each day nearly 1 million users are registering in WhatsApp and its user base is expanding at a very drastic rate and I realised that the WhatsApp was acquired by Facebook for 19 billion dollars. I was really shocked when I saw the figure and started questioning myself on the reasons behind paying such a huge amount for a messaging app like WhatsApp. It added more curiosity in me to do more research about the usage of WhatsApp by common people and to find the reasons for its popularity.

After the introduction of the calling facility on the app, I felt that in future this can eliminate the process of recharging for getting talk time.

Research process : It started when I received an email from Dr Srilakshminarayana, congratulating me for having selected for working on project about how people are using WhatsApp in Mysore. We discussed about how we can start the project and how we can incorporate our knowledge in a project which can give lot of insights about the society. We decided to do this project in such a way that our mission and vision must align to the mission and vision of SDM IMD.

We then decided on the topics we will be focussing in a conclusion that in future we may add more objectives or may eliminate certain objectives. We initially came up with 10 objectives and we decided to do a brain storming session and prepare the questionnaire. After the discussion, we have prepared the final questionnaire for the pilot study, it consisted of about

100 questions and most questions were prepared in Likert scale.

The pilot study : As I was doing my first research project I had a doubt why we use this pilot study. Then my guide had explained the purpose of conducting a pilot study. I understood that pilot study is a standard scientific tool for 'soft' research, allowing scientists to conduct a preliminary analysis before committing to a full-blown study or experiment. This study will help in identify the problems one face while conducting the

actual research and also aid in improving the questionnaire for the actual study.

There may be several errors in the questionnaire we prepare and all the errors needed to be identified. Sometimes it may not be possible unless a pilot study is done. Through this we can find all the errors and also can modify the process of our research.

After the pilot study I have identified the following areas where we can improve the process

1) The length of questionnaire - as I have mentioned the pilot questionnaire consist of 100 questions and for a normal person to read and mark the right option it will take about 20 minutes. Suring the course of research this was the major challenge and after the filling was over some of them change their face expressions as it took away lot of their time. To tackle this problem I had cautioned them that it will take a little more time for the completion of the questionnaire. I have given them the questionnaire and asked them to bring it on the next day, but we can apply this technique to only those people whom we know personally.
2) Unclear questions - some people said that they didn't understand the few questions. So I found those questions and rephrased it so that the common men can easily understand the questions.
3) Insufficient options – some of the respondents helped in identifying the possible options that can be added to the questionnaire and this helped me a lot in preparing the final questionnaire. This has given me a lot of ideas in improving the questionnaire by including questions that are more related
4) Biasness – some questions in the pilot study only focused on one side of the issue but I was able to identify the other side of the issues when I interacted with different people and it was a real eye opener
5) Way of approaching people – when we are approaching different people, for them we are strangers they may see us with suspicion. While approaching those people we have to be very careful and we should carry necessary ID proof.
6) Area selection – it is a very important criteria when you go for research, we have to look into factors like the nature of the people who are part of the survey and also the no of people in that area because we have to use the time very carefully.

Final research: After getting the insights from the pilot study we had launched the final study in which the objectives are again revisited and corrections were made. The final questionnaire had mainly focused only on student community and the project was planned for conducting in two phases. The study was conducted within Mysore as research boundary. The number of questions was shortened to 20 and the study was initiated. When I tried to convince people to be a part of our research, many of them felt happy to join our research and many of them have asked about how we are conducting the process and I have given them some insights about the process.

Lessons learned : World may not be perfect and we may not find everything perfect. But as a marketing research person we should find opportunities in everything. During the course of the research I was able to meet a lot of people and while interacting with each person I learnt lot of new insights. I got expert opinion from many faculties as a feedback and it has actually nurtured my knowledge and they also have given insights from their experience. I was lucky to meet many college students who later become my friends and which improved my interaction skills.

This research helped me in recollecting all the fundamentals of marketing research and also helped me to see how big a small app like WhatsApp is. It helped me to know how people are using this app, how differently we can use this app and the perception of public towards the messaging app.

Another important dimension I learned is how to contribute to the society and how our research can become an eye opener for the upcoming generation. I am very sure that if someone reads our report surely they will get lot of insights on the usage of the app.

Before doing the research my perception was WhatsApp was for young people but I realised that old people are also using the app very frequently, and many companies are using this app for internal communication.

Research is not a one way process it's a process in which we are giving the society about what we found out and learning from others experience. It also

helped me to deeply understand different statistical tools and methods used for data analysis.

References

Aharony, N., T., G., (2016). The Importance of the WhatsApp Family Group: An Exploratory Analysis. Aslib Journal of Information Management, Vol. 68, Issue 2, pp.1-37.

Ahmad, B., I., A. (2014). The Effect of "WhatsApp" Electronic Dialogue Journaling on Improving Writing Vocabulary Word Choice and Voice of EFL Undergraduate Saudi Students. 21st Century Academic Forum Conference at Harvard –2014 Boston, MA U.S.A. Official Conference Proceedings. pp. 32-47.

Ahmad, A., I., Hadiza, H., and Rabiu, G., I. (2015). Psychometric Properties of WhatsApp Use and Perceived Academic Performance: An Exploratory Factor Analysis. Journal of Creative Writing. Vol.1, issue 4, pp-57-64.

Alfonso, S-M., Olga, C-M. (2015). "Hey there! I am using WhatsApp": a preliminary study of recurrent discursive realisations in a corpus of WhatsApp statuses. Procedia - Social and Behavioral Sciences 212, pp.52 – 60.

Amry, A., B., (2014). The impact of WhatsApp mobile social learning on the achievement and attitudes of female students compared with face to face learning in the classroom. European Scientific Journal. vol.10, No.22, pp.116-136.

Annie, D.A. and Syamimi, Md., A. L. (2014). Convenience or Nuisance?: The 'WhatsApp' Dilemma. Procedia - Social and Behavioral Sciences. Vol.155, pp. 189 –196.

Avani, M. and Aanal, M. (2014). Educating WhatsApp generation through "WhatsApp". ZENITH International Journal of Multidisciplinary Research. Vol.4 (8), pp. 23-38.

Bere, A. (2012). A comparative study of student experiences of unquitious learning via mobile devices and learner management systems at a South African university. Proceedings of the 14th Annual Conference on World Wide Web Applications. Cape Peninsula University of Technology, http://www.zaw3.co.za/index.php/ZA-WWW/2012/paper/viewFile/537/160.

Benzécri, J.-P. (1973). L'Analyse des Données. Volume II. L'Analyse desCorrespondances. Paris, France: Dunod.

Bouhnik, D., & Deshen, M. (2014). WhatsApp goes to school: Mobile instant messaging between teachers and students. Journal of Information Technology Education: Research, Vol.13, pp.217-231.

Church, K. and Oliveira, R. (2013). What's up with WhatsApp? Comparing Mobile Instant Messaging Behaviors with Traditional SMS. Proceedings of the 15th international conference on Human-computer interaction with mobile devices and services. Munich, Germany, August 30th. pp. 352-361.

Chokri, B. (2015). The Effectiveness of WhatsApp Mobile Learning Activities Guided by Activity Theory on Students' Knowledge Management. Contemporary Educational Technology, Vol.6 (3), pp.221- 238.

George D, Mallery P. (2003). SPSS for Windows step by step guide: A simple guide and reference. 11.0 update (4th ed.). Boston: Allyn and Bacon.

Greenacre, Michael (2007). Correspondence Analysis in Practice, Second Edition. London: Chapman & Hall/CRC.

Gutiérrez-Colon, M., Gibert, M.I., Triana, I., Gimeno, A., Appel, C. and Hopkins, J. (2013). Improving learners' reading skills through instant short messages: a sample study using WhatsApp. Global perspectives on Computer-Assisted Language Learning. Glasgow, 10-13 July 2013. pp. 80-84.

Hashim, N., A., Abdullah, N., L., Rosmah, M., I., and Janor, H. (2015). WhatsApp messenger application among Business students in Malaysia- An exploration. Jurnal Personalia Pelajar. Vol. 18 (2), pp. 130-141.

Hirschfeld, H.O. (1935). A connection between correlation and contingency. Proc. Cambridge Philosophical Society, Vol.31, pp.520–524

Jeffrey, M. and Musah, A. (2015). Social Media Network Participation and Academic Performance in Senior High Schools in Ghana. Library Philosophy and Practice (e- journal). Paper 1286. http://digitalcommons.unl.edu/libphilprac/1286.

Jisha, K., and Jebakumar (2014). WhatsApp: A Trend Setter in Mobile Communication among Chennai Youth. IOSR Journal of Humanities and Social Science. Volume 19, Issue 9, Ver. VII, pp.01-06.

Jyothi, K. (2014). Customer satisfaction towards WhatsApp' in Lucknow. International Journal of Innovative Research in Technology. Vol.1, Issue 10, pp.87-94.

Karapanos, E., Teixeira, P., and Gouveia, R. (2016). Need fulfilment and experiences on social media: A case on Facebook and WhatsApp. Computers in Human Behavior Vol.55, pp.888-897.

Karthikeyan, V.P., Tony, V. O., and Sanal, J. (2015). A study on impact of WhatsApp among college students in Coimbatore district. Indian Streams Research Journal. Vol.4, Issue-12, pp.1-7.

Lauricella, S. and Kay, R. (2013). Exploring the use of text and instant messaging in higher education classrooms. Research in Learning Technology, 2013, Vol. 21, p1.

Likert, Rensis (1932). A Technique for the Measurement of Attitudes. Archives of Psychology,140: pp. 1–55.

Michael, S., Anika, S., Tobias, H., Phuoc, T-G. (2015). Analysis of Group-Based Communication in WhatsApp. Mobile Networks and Management. Vol.158 of the series Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering, pp. 225-238.

Montag. C., Konrad, B., Rayna, S., Bernd, L., Ionut, A., Boris, T., Mark, E., and Alexander, M. (2015). Smartphone usage in the 21st century: who is active on WhatsApp? BMC Res Notes. 8:331, pp. 1-6.

Navjit, S., Nidhi, C., and Jaspreet, K. (2015). A study to analyse relationship between psychological behavioral factors on WhatsApp addiction among Youth in Jalandhar District in Punjab. Global Advanced Research Journal of Management and Business Studies. Vol. 4(5) pp. 203-207.

Hara, K., Massimi, M., Harper, R., Rubens, S., & Morris, J. (2014). Everyday dwelling with WhatsApp. Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing. ACM, Baltimore, MD, USA. pp.1131-1142.

Richard, S. (2014). The Adoption of WhatsApp: Breaking the Vicious Cycle of Technological Poverty in South Africa. Journal of Economics and Behavioral Studies. Vol. 6, No. 7, pp. 542-550.

Sherwyn P. Morreale & Judy C. Pearson (2008) Why Communication Education is Important: The Centrality of the Discipline in the 21st Century, Communication Education, 57:2, pp. 224-240.

Shobha, P., Deepthi, Tadasad, P.G. (2015). Usage of WhatsApp messenger amongst post-graduate students in a university environment: A study of Karnataka state

women's university, Vijayapura. International Journal of Multidisciplinary Research and Development. Vol.2, Issue 11, pp. 591-594.

Shravan (2015). WhatsApp Usage Differences amongst Genders: An Exploratory Study. Indian Journal of Marketing. Vol.45, issue 5, pp.27-37.

Sunita, S., and Seeza, F. (2015). WhatsApp- Messenger Fever on Students. ASM's International E-Journal on Ongoing Research in Management and IT. Vol. 10, pp.59-68.

Smit, I. (2015). WhatsApp with Learning Preferences? Frontiers in Education Conference (FIE), Oct 21-24, 2015. 32614 2015. IEEE, pp. 1-6.

Tulika, B. and Dhananjaya Joshi (2014). A Study of Students' Experiences of Mobile Learning Global Journal of Human Social Science: H Interdisciplinary. Vol.14, Issue 4 Version 1.0. pp. 27-33.

Yeboah, J. and Ewur, G., D. (2014). The Impact of WhatsApp Messenger Usage on Students Performance in Tertiary Institutions in Ghana. Journal of Education and Practice. Vol.5, No.6, pp. 157-164.

Yeboah Solomon Tawiah, Horsu Emmanuel Nondzor, Abdulai Alhaji. Usage of WhatsApp and Voice Calls (PhoneCall): Preference of Polytechnic Students in Ghana. Science Journal of Business and Management. Vol. 2, No. 4, 2014, pp. 103-108.

Appendix-1

Questionnaire Final

Dear Sir/Madam

We introduce ourselves as a research team at Shri Dharmasthala Manjunatheshwara Institute for Management Development, Mysore, who have taken up a project that deals with the usage of WhatsApp. The title of the project is "WhatsApp and its usage-an exploratory study". The objectives include collecting information regarding its usage. This project is purely for academic purpose and, the responses given by you will not be shared with anyone and used only for academic purpose.

We request you to cooperate and give your valuable response.

Thanking you,

Yours very truly,

Research Team SDMIMD, Mysore Date

1. May we know your good name.....

2. Which among the following you use for communication other than WhatsApp (You can choose multiple options)

   a. Phone call b. SMS
   c. Email
   d. Facebook message

3. Can you rank them as per the importance you give (On a 5 point ranking)

Phone Call	
SMS	
Email	
WhatsApp message	
Facebook message	

4. Do you check WhatsApp message

	YES	NO
As soon as you wake up in the morning		
During free time		
Before going for sleep		
Always, since it is an integral part of my life		

5. Can you please give your opinion on the following

Score	Strongly Agree	Agree	Disagree	Strongly Disagree	Undecided
WhatsApp can be used for study purpose.					
It can be used for daily communication better than other options.					
WhatsApp takes the important messages faster amongst my friends.					
I spend most of the time on WhatsApp as it is interesting.					
Information about classes, meetings, projects etc. is sent faster on the app.					
WhatsApp has become an important part in my life.					
After putting the pics on WhatsApp I post less pics on the Facebook.					
After started using the app, I have decreased the frequency of checking emails.					
I check my status on the app very frequently.					
I become part of the groups of my choice and interest.					
I am more secure and comfortable on the App.					
This App is used by me because of its simplicity and easy usage.					
Receiving personal information and sharing the same is easy on this app.					
I came closer to my friends after using this app.					
Sending an SMS is old fashion and sending messages on the app is latest.					

6. What is your opinion on the following?

Score	Strongly Agree	Agree	Disagree	Strongly Disagree	Undecided
Teachers also have to encourage using the app and also become a part of the groups so that information exchange can be done fast.					
Because of this app, the networking can be strengthened and also can be built.					
Conversation on the app is like talking to another person.					
Introduction of the Facebook on all types of mobiles will decrease the usage the WhatsApp. (Digital India Initiative by the Govt)					
WhatsApp message reaches faster than SMS.					
I think that using a WhatsApp is better than a Facebook, Email, and a phone call.					
I prefer to use calling facility in WhatsApp over a regular phone call.					
A free Wi-Fi will improve the communication between the members of society					
More people will use WhatsApp if the govt. gives free Wi-Fi facility.					
Due to free Wi-Fi, women can use WhatsApp for their safety, by giving quick messages to their friends.					
Police adopting the app for protecting women will be an encouraging option.					
I started using the App because of my friends suggested me to use.					
I am aware of the app and using it from very long time.					

7. On average how much time do you spend time on the App?
   a. <1 hr b. 1-2 hrs
   c. 3-4 hrs d. Others……

8. Since how long you have been using the app
   a. < 1 mont b. 1-3 months
   c. 3-6 months d. 9-12
   e. >1 yr

9. How many times a day on average, you check status on the App?
   a. <5 b. 5-10
   c. 10-15 d. 15-20
   e. if >20 (Specify)……

10. The amount of data you recharge each time
    a. 100 mb-150 mb b. 150 mb-200 mb
    c. 200 mb-300 mb d. 300 mb-500 mb
    e. 500 mb – 1 gb f. > 1gb

11. Which among the below you feel that students have to use WhatsApp to communicate? (You can choose multiple options)
    a. Information relating the classes.
    b. Subject matters or quick updates on news.
    c. Relating to entertainment and fests
    d. Information relating to recent trends in the curriculum/syllabus.
    e. Others (specify)……

12. Can you please specify your age?
    a. 18-20 b. 21-25
    c. 26-30 d. 31-35

13. Gender
    a. Male b. Female c. Others

14. Please specify your educational qualification
    a. Tenth b. PUC
    c. Graduation (Specify)……
    d. Post-Graduation (Specify)……
    e. Others (specify)……

15. Family status
    a. Nuclear b. Joint

16. Number of family members
    a. 2-3 b. 4-6
    c. 6-8 d.....

17. I also use the App for the following (You can choose multiple options).
    a. Send Images very frequently.
    b. Sharing videos.
    c. Sending news and other related information.
    d. Chatting.

18. Sometimes I mute the app because
    a. Many messages at a time disturbs me.
    b. I am busy with the work.
    c. I feel bored looking at the messages.
    d. I am noticed by other whether I am online or not.
    e. Others (Specify).....

19. Can you please rank the following?

Facebook	
WhatsApp	
Twitter	
Line	

20. Do you use WhatsApp if it is not cheap/free?
    a. Yes b. No

We thank you for your valuable responses

Appendix-2

List of the variables and scaling considered in the study

Question	Variable name	Code	Type	Scaling	
Communication other than WhatsApp	Comm_other_WhatsApp	Q2a, Q2b, Q2c, Q2d	Cat	Nominal	
Ranking given to other options including WhatsApp	Rank_others_WhatsApp	Q3a, Q3b, Q3c, Q3d, Q3e	Cat	Ordinal	
When do you check WhatsApp message?	Check_WhatsApp_msg	Q4a, Q4b, Q4c, Q4d	Cat	Nominal	
WhatsApp can be used for study purpose	Study_purp_WhatsApp	Q5a	Cat	Likert Scale	
Used for daily communication	Daily_commu	Q5b	Cat	Likert Scale	
WhatsApp takes the important messages faster amongst my friends.	Import_msgs_faster	Q5c	Cat	Likert Scale	
I spend most of the time on WhatsApp as it is interesting.	Spend_time_onWhatsApp	Q5d	Cat	Likert Scale	
Information about classes, meetings, projects etc. is sent faster on the app.	Informat_classes_meetings_ faster	Q5e	Cat	Likert Scale	
WhatsApp has become an important part in my life.	WhatsApp_import_in_life	Q5f	Cat	Likert Scale	
After putting the pics on WhatsApp I post less pics on the Facebook.	Putpics_app_lesspic_facebk	Q5g	Cat	Likert Scale	
After started using the app, I have decreased the frequency of checking emails.	Usng_app_dec_email_chk	Q5h	Cat	Likert Scale	
I check my status on the app very frequently.	Check_status_freq	Q5i	Cat	Likert Scale	
I become part of the groups of my choice and interest.	Become_part_of_grps	Q5j	Cat	Likert Scale	
I am more secure and comfortable on the App.	More_secu_comfort	Q5k	Cat	Likert Scale	
This App is used by me because of its simplicity and easy usage.	Simplicity_easy_usage	Q5l	Cat	Likert Scale	
Receiving personal information and sharing the same is easy on this app.	Recev_inform_sharng_easy	Q5m	Cat	Likert Scale	
I came closer to my friends after using this app.	Came_closer_to_friends	Q5n	Cat	Likert Scale	
Sending an SMS is old fashion and sending messages on the app is latest.	Sending_msgs_latest	Q5o	Cat	Likert Scale	
Teachers also have to encourage using the app and also become a part of the groups so that information exchange can be done	Teachers_encrg_use_app	Q6a	Cat	Likert Scale	

fast.					
Because of this app, the networking can be strengthened and also can be built.	Network_strngth_app	Q6b	Cat	Likert Scale	
Conversation on the app is like talking to another person.	Convers_app_easy	Q6c	Cat	Likert Scale	
Introduction of the Facebook on all types of mobiles will decrease the usage the WhatsApp. (Digital India Initiative by the Govt)	Facebk_onall_dec_app	Q6d	Cat	Likert Scale	
WhatsApp message reaches faster than SMS.	App_msgs_faster	Q6e	Cat	Likert Scale	
I think that using a WhatsApp is better than a Facebook, Email, and a phone call.	App_better_fbk_email	Q6f	Cat	Likert Scale	
I prefer to use calling facility in WhatsApp over a regular phone call.	Use_app_Call	Q6g	Cat	Likert Scale	
A free Wi-Fi will improve the communication between the members of society	Free_WIFI_imprvs_commu	Q6h	Cat	Likert Scale	
More people will use WhatsApp if the govt. gives free Wi-Fi facility.	More_ppl_use_app_Wifi	Q6i	Cat	Likert Scale	
Due to free Wi-Fi, women can use WhatsApp for their safety, by giving quick messages to their friends.	Free_WIFI_Women_safety	Q6j	Cat	Likert Scale	
Police adopting the app for protecting women will be an encouraging option.	Police_use_app	Q6k	Cat	Likert Scale	
I started using the App because of my friends suggested me to use.	Use_app_frnds_suggest	Q6l	Cat	Likert Scale	
I am aware of the app and using it from very long time.	Aware_app_usng_longtime	Q6m	Cat	Likert Scale	
average time do you spend time on the App	Avg_time_spend_app	Q7	Cat	Ordinal	
Since how long you have been using the app	Using_app	Q8	Cat	Ordinal	
How many times a day on average, you check status on the App?	Avg_chk_status	Q9	Cat	Ordinal	
The amount of data you recharge each time	Data_rchg	Q10	Cat	Ordinal	
Students have to use WhatsApp to communicate	Students_use_app	Q11a,Q11b Q11c,Q11d Q11e	Cat	Ordinal	
Can you please specify your age?	Age	Q12	Cat	Ordinal	
Gender	Gender	Q13	Cat	Nominal	
Educational qualification.	Edu_qua	Q14	Cat	Ordinal	
Family status	Family_stat	Q15	Cat	Ordinal	
Number of family members	Family_mem	Q16	Cat	Ordinal	
I also use the App	Use_app	Q17a, Q17b, Q17c Q17d	Cat	Ordinal	
I mute the app because	Mute_app	Q18a, Q18b, Q18c, Q18d, Q18e	Cat	Ordinal	
Can you please rank the following	Rank	Q19a,Q19b,	Cat	Ordinal	

		Q19c Q19d			
Use WhatsApp if it is not cheap/free?	App_cheap	Q20	Cat	Ordinal	

Appendix-3

Results of Factor analysis

Table-69

Communalities		
	Initial	**Extraction**
Q5a	1.000	.640
Q5b	1.000	.501
Q5c	1.000	.396
Q5d	1.000	.593
Q5e	1.000	.640
Q5f	1.000	.576
Q5g	1.000	.619
Q5h	1.000	.582
Q5i	1.000	.497
Q5j	1.000	.470
Q5k	1.000	.582
Q5l	1.000	.505
Q5m	1.000	.382
Q5n	1.000	.539
Q5o	1.000	.492
Q6a	1.000	.683
Q6b	1.000	.642
Q6c	1.000	.368
Q6d	1.000	.538
Q6e	1.000	.596
Q6f	1.000	.683
Q6g	1.000	.575
Q6h	1.000	.560
Q6i	1.000	.691
Q6j	1.000	.647
Q6k	1.000	.593
Q6l	1.000	.727
Q6m	1.000	.446

Source: constructed by the researcher based on data analysis.

Table-70

Communalities		
	Initial	**Extraction**
Q5a	1.000	.647
Q5b	1.000	.599
Q5c	1.000	.455
Q5d	1.000	.617
Q5e	1.000	.659
Q5f	1.000	.593
Q5g	1.000	.634
Q5h	1.000	.604
Q5i	1.000	.487
Q5k	1.000	.592
Q5l	1.000	.494
Q5n	1.000	.566
Q5o	1.000	.493
Q6a	1.000	.657
Q6b	1.000	.655
Q6d	1.000	.627
Q6e	1.000	.706
Q6f	1.000	.671
Q6g	1.000	.585
Q6h	1.000	.595
Q6i	1.000	.698
Q6j	1.000	.656
Q6k	1.000	.603
Q6l	1.000	.841
Q6m	1.000	.461

Source: constructed by the researcher based on data analysis

Table-71

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.769	15.075	15.075	3.769	15.075	15.075	2.887	11.549	11.549
2	2.717	10.868	25.943	2.717	10.868	25.943	2.049	8.195	19.744
3	1.964	7.858	33.801	1.964	7.858	33.801	1.773	7.094	26.838
4	1.318	5.274	39.075	1.318	5.274	39.075	1.598	6.391	33.229
5	1.234	4.937	44.012	1.234	4.937	44.012	1.575	6.301	39.530
6	1.115	4.459	48.470	1.115	4.459	48.470	1.530	6.119	45.649
7	1.063	4.253	52.723	1.063	4.253	52.723	1.356	5.424	51.073
8	1.011	4.043	56.766	1.011	4.043	56.766	1.323	5.293	56.365
9	1.002	4.009	60.775	1.002	4.009	60.775	1.102	4.409	60.775
10	.909	3.636	64.411						
11	.842	3.366	67.777						

Source: constructed by the researcher based on data analysis

Table-72

Rotated Component Matrixa									
	Component								
	1	2	3	4	5	6	7	8	9
Q5a	-.013	.003	.132	.368	.007	-.202	.643	.079	.184
Q5b	.081	.638	.066	.190	.349	-.069	-.113	-.032	-.073
Q5c	.279	.285	-.066	.472	.087	-.051	-.136	.172	.101
Q5d	-.144	.242	.699	.005	-.014	.089	.139	.144	.018
Q5e	.073	.172	-.099	.761	-.061	.138	.064	.091	-.017
Q5f	-.148	.589	.261	-.023	-.159	-.041	.322	.108	.115
Q5g	.186	.011	.101	.111	.006	.111	.068	.748	-.036
Q5h	.014	-.163	.371	-.094	.299	-.009	-.054	.578	.069
Q5i	.073	.096	.634	.040	.070	.092	-.115	.205	-.012
Q5k	-.026	.242	.395	.535	.052	.041	.206	-.205	.043
Q5l	.163	.609	.057	.198	.003	.172	.008	-.084	.129
Q5n	.138	-.028	.223	.128	-.100	.658	-.005	.083	.175
Q5o	-.013	.200	-.028	-.003	.195	.627	.078	.059	.107
Q6a	.193	.119	-.021	-.111	.096	.219	.722	-.041	-.113
Q6b	.401	.341	-.207	.015	-.019	.354	.370	.270	.001
Q6d	-.099	-.191	.070	.040	.746	-.006	.030	.048	.116
Q6e	-.115	-.085	.330	.437	.156	.444	-.060	-.184	-.356
Q6f	-.029	.237	.025	.018	.640	.321	.028	.272	-.160
Q6g	.164	-.021	.497	-.119	.465	-.024	.168	-.212	.079
Q6h	.756	.037	.046	.004	-.004	-.083	.091	-.001	.069
Q6i	.812	.061	-.027	-.043	.024	.132	-.031	.008	-.118
Q6j	.775	-.086	-.029	.152	.023	.080	.022	.119	.042
Q6k	.762	.011	.014	.052	-.094	-.008	.067	.074	-.008
Q6l	-.021	.088	.048	.044	.069	.236	.012	-.026	.876
Q6m	-.080	.66	.104	.101	-.199	.122	.099	-.034	-.020

Source: constructed by the researcher based on data analysis

Table-73

Rotated Component Matrixa									
	Component								
	Accessibility and safety	Flexibility and ease in usage	Preference of usage	Quick communication	Better means of communication	Latest and comfortable	Useful academic tool	Frequency of usage	My friends choice
Q5a							.643		
Q5b		.638							
Q5c				.472					
Q5d			.699						
Q5e				.761					
Q5f		.589							
Q5g								.748	
Q5h								.578	
Q5i			.634						
Q5k				.535					
Q5l		.609							
Q5n						.658			
Q5o						.627			
Q6a							.722		
Q6b	.401								
Q6d					.746				
Q6e				.437					
Q6f					.640				
Q6g			.497		.465				
Q6h	.756								
Q6i	.812								
Q6j	.775								
Q6k	.762								
Q6l									.876
Q6m		.606							

Source: constructed by the researcher based on data analysis

Table-74

Factors and Factor scores

Accessibility and safety	Flexibility and ease in usage	Preference of usage	Quick communication	Better means of communication	Latest and comfortable	Useful academic tool	Frequency of usage	My friends choice
0.16361	-0.37748	0.25123	1.00571	0.60927	-1.18928	0.10116	-1.75796	0.42746
1.30711	0.92264	1.00195	-0.43344	-0.40607	-0.96758	0.75949	0.57831	-0.75931
0.99734	0.26388	1.92028	1.19974	-1.70855	0.09922	0.68892	1.82998	-0.10886
0.74357	0.13255	0.906	0.04759	1.66584	1.16087	0.56228	0.6378	0.08453
0.27638	0.81102	0.30262	0.57663	1.29091	0.55041	0.32689	0.97533	-0.07081
0.8976	0.07958	-0.3093	0.28987	0.56225	-0.00611	0.21232	0.73167	0.48418
-0.01491	0.19438	-0.3255	1.21014	-0.87689	-0.06498	-0.2516	0.97885	-1.28881
0.35743	1.361	-0.4746	0.30925	-0.10831	0.49017	-1.20554	0.63552	-0.76698
0.3572	-1.05609	2.08223	0.16813	-1.19909	-1.31578	-1.58505	1.40367	0.81898
0.85733	0.22349	-0.37214	0.18595	0.57856	-0.58497	0.65066	-0.27975	-1.17832
-0.2529	-0.03813	0.05582	0.56751	-0.89576	0.63205	0.13005	-0.89105	-0.43735
0.03815	0.03221	0.61614	-3.5846	1.49316	-0.9583	0.29318	-0.1378	-0.21059
0.61961	0.03511	0.72926	0.51082	1.96373	0.17501	1.16368	-0.3933	0.5885
1.04524	0.14866	1.74463	-0.06411	1.32263	0.19977	1.36069	0.55231	0.59132
-0.85397	0.07894	1.7887	-3.04255	0.56181	-0.06714	2.73652	-0.35674	-2.46164

-0.417	-0.67718	1.53668	-1.25732	1.53902	-1.67227	2.02482	0.19925	-0.0849