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A Study of the Mobile Phone Impact on Under Graduate Students Based on Statistical Tools

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ABSTRACT

Now a days mobile phones have become an indispensable tool as communication plays a key role in all the aspects of life. It has become an essential accessory carried by everybody not only because they make it easy to keep in touch with people but because of the various facilities they offer especially the internet. The charm of mobile phone is more among young generation and the increasing use may result in dependence. Aim was to study the usage pattern and dependence of mobile phones among college students. A cross sectional study conducted among 200 UG students and studied the pattern of usage of mobile phones, common problems encountered and its dependence using a questionnaire. Using Statistical tools we anyalised the data and our study shows Samsung mobile brand is more popular among the studens and they are mostly preferred the Idea' Sim card company students. The proportion of students in urban area are spend maximum time as compared to rural area for use of mobile phone, mostly students use mobile phones for calling and Internet.

KEYWORDS: *Mobile phone, Facilities, Graphical Representation, Large Test, Level of Significance, ANOVA*

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INTRODUCTION:

A mobile phone is a telephone that can make and receive calls over a radio frequency carrier while the user is moving within a telephone service area. Most mobile telephones services use cellular network architecture and therefore mobile telephones are often called as cellular telephones. Modern mobile phones support variety of other services such as 'Text messaging, MMS, Email, Internet access, Bluetooth, Gamming Communication & Photography. Mobile phones which after these and more general computing capabilities and referred to as a "Smart phones" hence it become an indispensable tool as communication plays a key role in all the aspects of life. Today, mobile phones are equipped with features other than voice call that allow further communications and entertainments such as the Short message service (SMS), MP3 player, games, internet and videos which attracted people across all walks of life and consequently led to the increase in the number of mobile phone users across the world Sanjay D et.al.(2010) .There are about 3.3 billion mobile phone users when compared to 500 million in the year 2000. F.Samkange-Zeeb, M. Blettner(2009). Indians are increasingly using the mobile phones rather than the land line telephones and Indian market has emerged as the second-largest market for mobile phone handsets next to China. In India, use of internet is enormous, especially in the young population. Mobile Internet usage is growing at the rate of nearly 85% per annum Singh BM.(2008). Mobile phone dependence can be considered as a new diagnostic entity as it has properties of excessive use, withdrawal, tolerance and negative repercussions Chandra G et.al (2012). Nomophobia is a term which is related to mobile phones usage Singh BM.(2008). It literally means no- mobile phobia that is the fear of being out of mobile phone contact. The person becomes anxious when there is no network or no balance or when run out of battery. Studies from United Kingdom revealed that 53% tend to be anxious and a study from Mumbai reports 58% could not manage without a mobile phone even for a day Katharine B(2008) .As mobile phone usage is increasing in our population and the younger generation is more likely to become dependent on mobile phones, we decided to conduct a study on the usage pattern and the dependence of mobile phones among our students.. In this study we have collect the primary data with a suitable questionnaire containing several attributes and these information collected from XI, XII and B.Sc., B. Com. etc. students from a rural and urban areas. And using several statistical tools and techniques we analysed the collected information we consider the demographic factors are associated with the use of cell phone, with monthly expenditure and with time spending on mobile phone. Mobile phones are used for a variety of purpose, such as keeping in touch with family members, internet, sms and study purpose etc.

OBJECTIVES:

- To test for equality of proportion of smart phone users in rural &Urban area.
- To test for Independence between the Awareness about Social media& Sex.
- To test Association between Banking Use & Area. (Urban &Rural).
- To test for Average time spend on Mobile (Based on gender).
- To check the daily average time spend on mobile of different age group of students is same or not .
- To check the no. of daily messages sending on mobile phone is independent on Gender.

METHODOLOGY:

For collection of primary data, we use questionnaire and the questionnaire includes the information about their area, address, caste, occupation, monthly income & use of phone& social media. We collect information of 240 students from Urban& Rural area respectively. The questionnaire is attached on last page of project.

Method of data collection:

For the project work, we have collected primary data from four colleges which are Rajarshi Chhatrapati Shahu College and Mahavir College,Kolhapur from urban area and the Nehru College, Kotoli and Vitthalrao Patil College kale from rural area. The convenience sampling method is used for collecting data from urban area and rural area using questionnaires method.

Statistical tools used:

- Graphical representation.
- Theory of attribute.
- Testing of hypothesis.
- ANOVA.

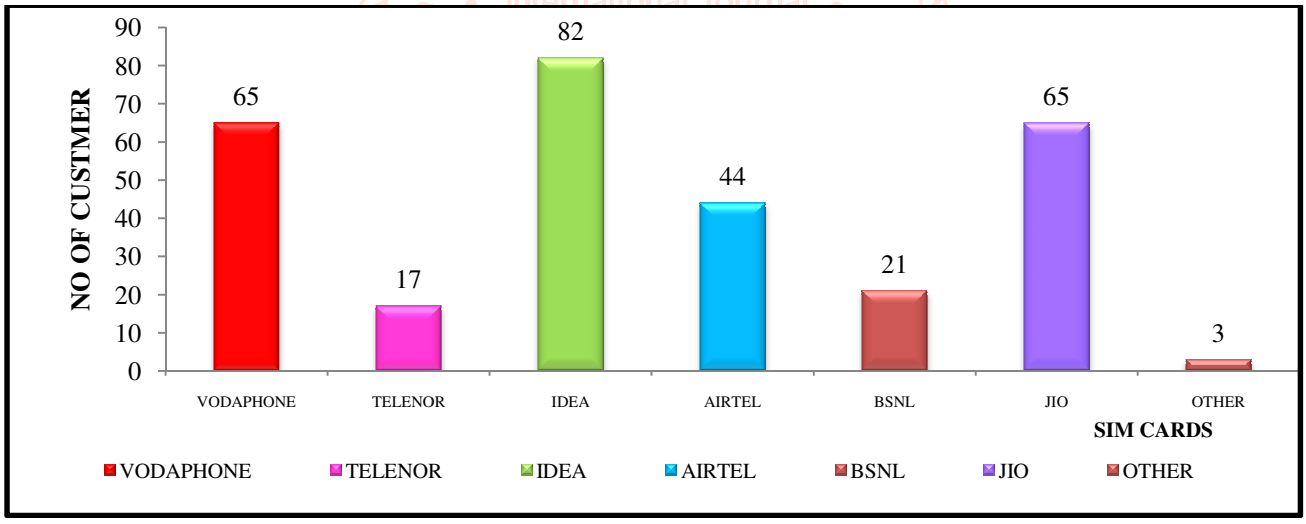
Software used:

- MS-Excel
- MS- Word

GRAPHICAL REPRESENTATION:

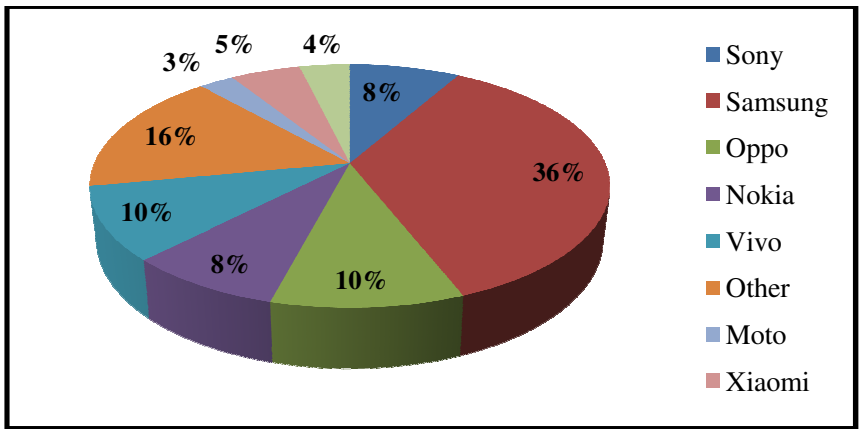
Simple Bar Diagram For Different Sim Cards.

Sim Cards	No. of Customers
VODAPHONE	65
TELENOR	17
IDEA	82
AIRTEL	44
BSNL	21
JIO	65
OTHER	3



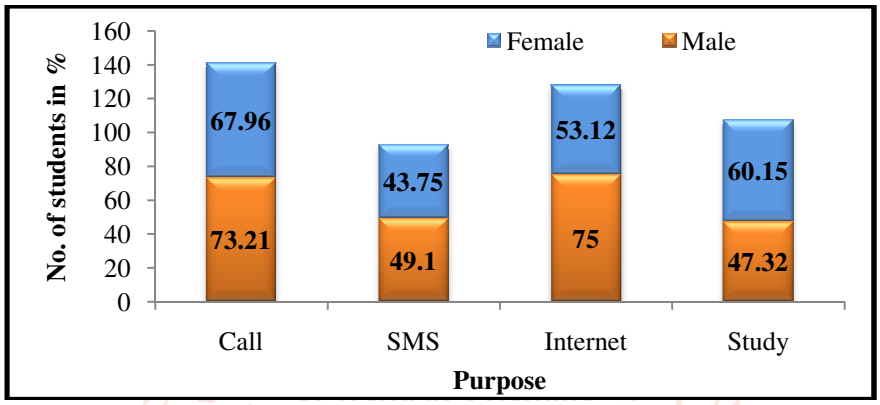
Pie -chart for distribution of company's of cell phone

Company	Frequency	Percentage
Sony	22	9.166666667
Samsung	96	40
Oppo	27	11.25
Nokia	22	9.166666667
Vivo	26	10.83333333
Other	44	18.33333333
Moto	7	2.916666667
Xiaomi	14	5.833333333
Lenovo	10	4.166666667



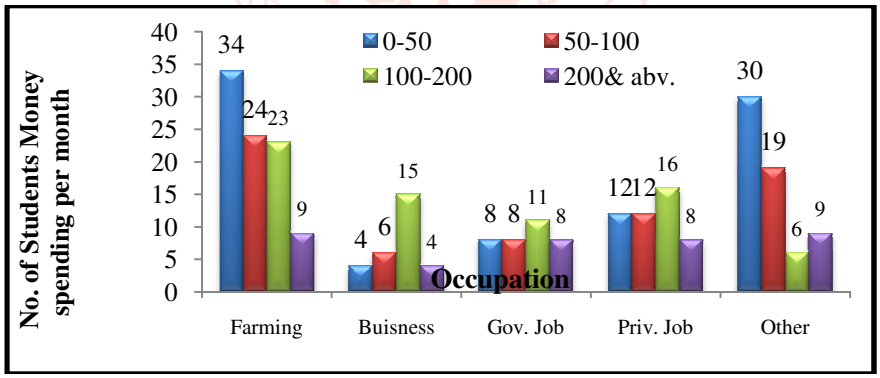
Purpose of Using Cell Phone Based On Gender.

Purpose / Gender	Call	SMS	Internet	Study
Male	73.21	49.1	75	47.32
Female	67.96	43.75	53.12	60.15



Multiple bar diagram for no. of students spending money on mobile phone by their family occupation

b	Farming	Business	Gov. Job	Priv. Job	Other
0-50	34	4	8	12	30
50-100	24	6	8	12	19
100-200	23	15	11	16	6
200&abv.	9	4	8	8	9



ANALYSIS PART:

A. Test for equality of proportion of smart phone users in rural & urban area.

H_0: proportion of smart phone user in urban and rural area is equal.

H_1: proportion of smart phone user in urban and rural area is not equal.

First Population is mobile users in urban area and second Population is mobile users in rural area.

P_1 and P_2be the proportion of smart phone users in urban area and rural area respectively

Mobile Users.	Smart Phone	Total
Rural	124	146
Urban	68	94
Total	**192**	**240**

Let n_1 *and* n_2 *be* mobile users in urban area and rural area observed values are 146 and 94.

The proportion of smart phone users in urban area and rural area are P_1 and P_2 and its values are

0.8493and 0.7234 respectively.we consider the level of significance α = 5%.

Hypothesis are stated as H_0: $P_1 = P_2$ against H_1: $P_1 \neq P_2$.

$\hat{p} = \frac{n_1p_1+n_2p_2}{n_1+n_2}$; $\hat{p} = 0.7999 \rightarrow \hat{q} = 0.2000$

Under H_0, the test statistics is,

$$|Z_0| = \left| \frac{p_1 - p_2}{\sqrt{\hat{p} \times \hat{q} \times (\frac{1}{n_1} + \frac{1}{n_2})}} \right|$$

Calculated value of Z is, $|Z_0| = 2.3862$ and Critical value = $Z_{\alpha/2} = 1.96$

B. Test for Independence between the Awareness about Social media & Sex.

H_0: The attributes Sex and Awareness about social media are independent. *V/S*

H_1: The attributes Sex and Awareness about social media are Not independent.

Level of significance = α % = 5%

Observation table:-

Sex	Awareness about Social Media		
	Yes	No	Total
Male	90	22	**112**
Female	87	41	**128**
Total	**177**	**63**	**240**

Let N be the population size is 240 ;Let 'a' and ' b' be number of male use social media in rural and urban area is 90 and 22 respectively and ' c' and ' d ' be number female use social media in rural and urban area is 87 and 41respectively

Under H_0, The test statistic

$\chi^2_{cal} = \frac{N(ad-bc)^2}{(a+b)(c+d)(a+c)(b+d)} \sim \chi^2_1$

$\chi^2_{cal} = 4.7353$ and Critical value :- α=0.05

$\chi^2_{tab} = \chi^2_{(r-1)(s-1),\alpha\% \text{ level of significance}} \chi^2_{tab} = \chi^2_{(1,0.05)} = 3.841$

Therefore, $\chi^2_{calculated} > \chi^2_{tabulated}$

C. Association between Banking Use and Area :

Observation table:

Area	Yes	No	Total
Rural	58	88	140
Urban	43	51	94
Total	101	139	N=240

Let the attribute A, α, be the number of students in rural and urban area and B and β be the number of students use mobile for banking purpose.

The observed frequencies are (AB) = 58 ; (Aβ) = 88 ;(αB)= 43; (αβ)= 51

a. Coefficient of association:

Q = $\frac{\{(AB)(\alpha\beta)-(A\beta)(\alpha B)\}}{\{(AB)(\alpha\beta)+(A\beta)(\alpha B)\}}$ and Q = -0.1225

b. Coefficient of Colligation:

Y = $\frac{\sqrt{(AB)(\alpha\beta)}-\sqrt{(A\beta)(\alpha B)}}{\sqrt{(AB)(\alpha\beta)}+\sqrt{(A\beta)(\alpha B)}}$ and Y=0.00868

D. To Analyze Average time spends on Mobile:

1. Average time spend by College students on mobile in Kolhapur

District as per area wise Hr/day is given below,

Observation table:-

Hours / Area	1Hr	2Hr	3Hr	4Hr	Total
Rural	69	88	81	24	262
Urban	50	18	33	96	197
Total	119	106	114	120	459

Average Time spend by Rural area= 1.794521 Hr/day
Average Time spend by Urban area= 2.095745 Hr/day

2. Average time spend by college students on mobile in Kolhapur

District as per gender wise Hr/day is given below,

Observation table:-

Hours / Gender	1Hr	2Hr	3Hr	4Hr	Total
Male	45	50	81	60	236
Female	74	56	33	60	223
Total	119	106	114	120	459

Average Time spend by Male= 2.1072Hr/day

Average Time spend by Female = 1.7423Hr/day

E. ANALYSIS OF VARIANCE:

H_0: Daily average times spend on mobile of college students by their age group is same.

H_1: Daily average times spend on mobile of college students by their age group is not same.

Groups	Count	Sum	Average	Variance
Column 1	123	182	1.47968	0.5795
Column 2	81	192	2.37037	1.2612
Column 3	35	81	2.31429	1.574798

ANOVA:

Source of Variation	S.S.	d.f.	M.S.	F-Cal	P-value	F-Tab.
Between Groups	45.6557	2	22.828	23.93	3.45E-10	3.0341
Within Groups	225.131	236	0.9539			
Total	270.787	238				

F. Chi-Square test for independents of Attributes in case of 4 x 2 Contingency table.

H_0**:** No. of daily messages sending on mobile phone is independent on Gender

H_1: No. of daily messages sending on mobile phone is not independent on Gender.

Observation Table:

Gender	Messages				
	0-10 msg	10-50 msg	50-100 msg	100 & above	Total
Male	51	22	27	12	112
Female	76	28	19	5	128
Total	127	50	46	17	240

$x^2_{cal} = 8.88775158$ **and** Degrees of freedom=(r-1)*(s-1) = 3

At 5% level of significance, $x^2_{tab} = x^2_{0.05,3} = 7.81472$

MAJOR FINDING:

- The Idea sim card is mostly use in college level students.
- The Samsung mobile brand is more popular in students.
- The purpose of using cell phone by male and female is different.
- Most of the students spending money up to 50 rupees per month.
- The proportion of smart phone users in urban &rural area is not equal.
- The attributes sex and awareness about social media in college students are not independent.
- The attribute area and use of mobile for banking are negatively associated each other.
- Average time spend by Urban area college students on mobile is greater than Rural area college students.
- Average time spend by Male on mobile is greater than Female.
- The daily average time spend on mobile of different age group of students is not same.
- The no. of daily messages sending on mobile phone is independent on gender.

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