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Smartphone Usage and its Applications among School going Children (5-16 Years) in Lahore, Pakistan

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Abstract

Objective: To analyze the most used applications on smartphone among school going children (5-16 years). **Study Design and Setting:** Descriptive cross sectional study comprised of five months (April 2017 to July 2017); concerned community survey i.e. door to door data collection method was carried out in Lahore, Pakistan. **Material and Methods:** Multistage cluster sampling technique was used. 6200 school going children were selected, 4030 (65%) respond to the study and remaining 2170 (35%) do not respond to the study (excluded from the research). Among 4030 school going children, 2889 (71.7%) were smartphone users (included in the analysis) and 1141 (28.3%) do not use smartphone (excluded in the analysis). Among 2889 school going smartphone users, 1993 (69%) were short term smartphone users and 896 (31%) were long term smartphone users. Descriptive statistics and Bi-variate logistic regression was applied on the gathered data. **Results:** Significant associations were found. The use of smartphone for messaging have p-value = 0.19, for Facebook p-value = 0.11, for WhatsApp p-value = 0.043, for playing games p-value < 0.001, for listening music p-value = 0.049, for watching videos and movies p-value = 0.030, for alarm purpose p-value = 0.001 and for camera purpose p-value = 0.015. **Conclusion:** The research findings showed that most used applications on smartphone among school going children (5-16 years) were WhatsApp and used smartphone for playing games, listening music, watching videos and movies, alarm and camera purpose with respect to which the study was concise.

Keywords: Short Term Smartphone Usage, Long Term Smartphone Usage, Applications, School Going Children.

1. Introduction

Zheng P, Ni LM (2016) investigated that smartphone is a new phase of mobile phone and has grown up over the last few years. Smartphones are not just for calls, but equipped with the various enhanced functions such as games, guidance, camera, audio and video sound reproduction, voice recorder, e-mail facility, calendar, alarm clock, memo, Microsoft office programs, built in apps for web sites and web surfing, Wifi, mobile data and many others. Smartphones are also customized with socializing facilities (Twitter, Instagram, Facebook, WhatsApp), GPS functions and strong outboard computer investigated by Gowthami S and Kumar SVK (2016). Gowthami S and Kumar SVK (2016) investigated that among developed countries like North America and Europe drives highest data usage per smartphone. However, in the developing world, they account for around 50% of mobile telecom. National Institutes of Health suggested restricting children to 1 to 2 hours of screen time as reported in U.S. Department of Health and Human Services from Internet (2017). In developing countries like Pakistan, people are rapidly adopting new technology particularly usage of mobile and social media. In Pakistan, the development of mobile applications has released a new information graphics that detailed the designs of smartphone usage as reported on Pakistan Advisers Society (2017). The information graphics revealed that among smartphone users in Pakistan, 35% of them carried a low cost phone for safety reasons, 60% of the Pakistani population have more than one mobile phone, among smartphone users 68% are on Android in Pakistan, 16% of smartphone users often purchase apps while remaining 84% of smartphone users install free apps and now in Pakistan 3G was introduced and because of this smartphone market is spreading quickly as reported on Pakistan Advisers Society (2017).

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2. Materials and Methods

2.1 Study Area and Subjects

The research was conducted in community by multi-stage cluster sampling technique which involved randomly selected clusters and then randomly choosing subjects from each cluster. 20 clusters or 20 union councils were selected randomly from all ten towns of Lahore i.e. two randomly selected union councils from each town of Lahore as shown in Table 1.

Table 1. Selected union councils from each town

Towns	Union Council
Allama Iqbal Town	Johar Town and Township
Aziz Bhatti Town	Taj Pura and Mughal Pura
Cantonment	R.A. Bazar and Cavalary Ground
Data Ganj Baksh Town	Anarkali and Qila Gujjar Singh
Gulberg Town	Model Town and Gulberg III
Nisthar Town	Green Town and DHA
Ravi Town	Shahdrah and Qila Lachman Singh
Samanabad Town	Gulshan-e-Ravi and Muslim Town
Shalimar Town	Begumpura and Shadbagh
Wagah Town	Daroghwala and Rivaz Garden

From each cluster or from each union council, 310 school going children (5-16 years) without any congenital physical and psychological health problem were selected from randomly selected houses. So from 20 clusters or 20 union councils, 6200 school going children (5-16 years) without any congenital physical and psychological health problem were selected randomly from all ten towns of Lahore. Among 6200 school going children, 4030 (65%) respond to the study and remaining 2170 (35%) do not respond to the study. So the response rate is 65%.

2.2 Sample Size

The formula of sample size was:

$$\text{Sample Size} = \frac{pqZ^2}{d^2}$$

p = anticipated population proportion = 72% = 0.72

q = 1-p = Probability of failure = 1–0.72 = 0.28

Z = Level of significance = 1.96

D = absolute precision required on either side of the proportion = 5% = 0.05

2.3 Data Collection Process

Structured questionnaire was prepared in English language; in which school going smartphone users were asked about hours of smartphone usage per day, smartphone usage for messages and calls, smartphone usage for Facebook, Whatsapp, Snapchat, playing games, listening music, watching videos and movies, for education, for camera and for alarm purpose. Questionnaire was then pretested and after pretesting, questionnaire was answered by school going children from 8 to 16 years of age and was presented with proper guidance to both parents and respondents of less than 8 years of age and was answered by both parents and their children because school going children of less than 8 years of age cannot independently respond to the questions in the research study accurately therefore parents involvement is necessary for effective data collection and was designed to achieve research objectives. Measurement of child weight and height was also done. Weight of target population was measured by weighing machine whereas; height of target population was measured by retractile steel measure tape ruler.

2.4 Data Analysis

To analyze the gathered data IBM SPSS Statistics Version 21 was used. Data was analyzed in percentage and cross-tabulations and were used to calculate frequency distribution. Mean and standard deviations were also calculated. Binary logistic regression was also applied to analyze the consequences of the independent variables on every outcome.

2.5 Ethical Approval

Before study initiation, the ethical and administrative approval was obtained from the respected supervisor. In the field, all school going smartphone users were given the letter of information in detail about the study objectives, procedures and the risks as well as the benefits involved. For this study, both oral and written informed consent was undertaken as well as confidentiality of data was also maintained.

3. Results

3.1 Smartphone Usage and its Applications among School going Children (5-16 years)

Smartphone usage for less and equal to 2 hours a day was considered as short term smartphone usage. Smartphone usage for more than 2 hours was considered as long term smartphone usage. Among 2889 smartphone users (Table 2), 1993 (69%) school going children were short term smartphone users who use smartphone for less than and equal to 2 hours a day and 896 (31%) school going children were long term smartphone users who use smartphone for more than 2 hours a day.

Table 2. Smartphone usage and its applications among school going children (5-16 years)

Variables	Frequency (N = 2889)	Percentage
Smartphone Use Per Day		
Less than and Equal to 2 hours	1993	69%
More than 2 hours	896	31%
Smartphone Use for Messages		
Often	549	19%
Sometimes	953	33%
Never	1387	48%
Smartphone Use for Calls		
Often	607	21%
Sometimes	1358	47%
Never	924	32%
Facebook Use on Smartphone		
Often	404	14%
Sometimes	1098	38%
Never	1387	48%
Whatsapp Use on Smartphone		
Often	462	16%
Sometimes	1127	39%
Never	1300	45%
Snapchat Use on Smartphone		
Often	347	12%
Sometimes	780	27%
Never	1762	61%
Play Games on Smartphone		
Often	1444	50%
Sometimes	1329	46%
Never	116	4%
Listen Music on Smartphone		
Often	809	28%
Sometimes	1387	48%
Never	693	24%
Watch Movies and Videos on Smartphone		
Often	1127	39%
Sometimes	1300	45%
Never	462	16%
Smartphone Use for Education Purpose		
Often	636	22%
Sometimes	1329	46%
Never	924	32%
Smartphone Use for Alarm Purpose		
Often	1213	42%
Sometimes	809	28%
Never	867	30%
Smartphone Use For Camera		
Often	896	31%
Sometimes	1358	47%
Never	635	22%

There were 1387 (48%) school going smartphone users who do not use smartphone to send messages, 549 (19%) who often use smartphone for messaging and 953 (33%) who sometimes use smartphone for messaging. There were 924 (32%) school going smartphone users who do not use smartphone for call purpose, 607 (21%) who often use smartphone for call purpose and 1358 (47%) who sometimes use smartphone for call purpose.

Among 2889 school going smartphone users, there were 404 (14%) school going children who often use smartphone for Facebook purpose, 1098 (38%) who sometimes use

smartphone for Facebook and 1387 (48%) who never used smartphone for Facebook. There were 462 (16%) school going children who often use smartphone for Whatsapp purpose, 1127 (39%) who sometimes use smartphone for Whatsapp and 1300 (45%) who never used smartphone for Whatsapp. There were 347 (12%) school going children who often use smartphone for Snapchat purpose, 780 (27%) who sometimes use smartphone for Snapchat and 1762 (61%) who never used smartphone for Snapchat as shown in Table 2.

Among 2889 school going smartphone users, there were 1444 (50%) school going children who often use smartphone for playing games, 1329 (46%) who sometimes use smartphone for playing games and 116 (4%) who never used smartphone for playing games. There were 809 (28%) school going children who often use smartphone to listen music, 1387 (48%) who sometimes use smartphone to listen music and 693 (24%) who never used smartphone to listen music. There were 1127 (39%) school going children who often use smartphone to watch videos and movies, 1300 (45%) who sometimes use smartphone to watch videos and movies and 462 (16%) who never used smartphone to watch videos and movies as shown in Table 2.

Among 2889 school going smartphone users, there were 636 (22%) school going children who often use smartphone for education purpose, 1329 (46%) who sometimes use smartphone for education purpose and 924 (32%) who never used smartphone for education purpose. There were 1213 (42%) school going children who often use smartphone for alarm purpose, 809 (28%) who sometimes use smartphone for alarm purpose and 867 (30%) who never used smartphone for alarm purpose. There were 896 (31%) school going children who often use smartphone for camera purpose, 1358 (47%) who sometimes use smartphone for camera purpose and 635 (22%) who never used smartphone for camera purpose as shown in Table 2.

3.2 Association of Smartphone Usage with its Applications among School going Children (5-16 years) in Lahore, Pakistan

Table 3 showed that among 1993 short term smartphone users, 297 (15%) children often used, 510 (26%) sometimes used and 1186 (59%) never used smartphone for messaging. 271 (14%) children often used, 994 (50%) sometimes used and 728 (36%) never used smartphone for call purpose. 153 (7%) children often used, 714 (36%) sometimes used and 1126 (57%) never used smartphone for Facebook. 197 (10%) children often used, 782 (39%) sometimes used and 1014 (51%) never used smartphone for Whatsapp. 103 (5%) children often used, 412 (21%) sometimes used and 1478 (74%) never used smartphone for Snapchat. 983 (49%) children often used, 934 (47%) sometimes used and 76 (4%) never used smartphone for playing games. 542 (27%) children often used, 1138 (57%) sometimes used and 313 (16%) never used smartphone to listen music. 696 (35%) children often used, 1084 (54%) sometimes used and 213 (11%) never used smartphone to watch videos and movies. 287 (14%) children often used, 1014 (51%) sometimes used and 692 (35%) never used smartphone for education purpose. 941 (47%) children often used, 504 (25%) sometimes used and 548 (28%) never used smartphone for alarm purpose. 382 (19%) children often used, 1194 (60%) sometimes used and 417 (21%) never used smartphone for camera purpose.

Table 3 showed that among 896 long term smartphone users, 252 (28%) children often used, 443 (50%) sometimes used and 201 (22%) never used smartphone for messaging. 337 (37%) children often used, 364 (41%) sometimes used and 196 (22%) never used smartphone for call purpose. 251 (28%) children often used, 384 (43%) sometimes used and 261 (29%) never used smartphone for Facebook. 265 (30%) children often used, 345 (38%) sometimes used and 286 (32%) never used smartphone for Whatsapp. 244 (27%) children often used, 368 (41%) sometimes used and 284 (32%) never used smartphone for Snapchat. 461 (52%) children often used, 395 (44%) sometimes used and 40 (4%) never used smartphone for playing games. 267 (30%) children often used, 249 (28%) sometimes used and 380 (42%) never used smartphone to listen music.

Table 3 showed that among 896 long term smartphone users, 431 (48%) children often used, 216 (24%) sometimes used and 249 (28%) never used smartphone to watch videos and movies. 349 (39%) children often used, 315 (35%) sometimes used and 232 (26%) never used smartphone for education purpose. 272 (30%) children often used, 305 (34%) sometimes used and 319 (36%) never used smartphone for alarm purpose. 514 (58%) children often used, 164 (18%) sometimes used and 218 (24%) never used smartphone for camera purpose.

Table 3. Association of smartphone usage with its applications among school going children (5-16 years)

Smartphone Usage (N = 2889)	Smartphone Usage		Odd Ratio 95% CI	P-value
	Short Term Users (n =1993)	Long Term Users (n = 896)		
Smartphone Use for Messages				
Often	297 (15%)	252 (28%)	1.55 (0.79–1.98)	
Sometimes	510 (26%)	443 (50%)	1.33 (0.61–1.50)	0.19
Never	1186 (59%)	201 (22%)	**reference**	
Smartphone Use for Calls				
Often	271 (14%)	337 (37%)	1.49 (0.90–1.80)	
Sometimes	994 (50%)	364 (41%)	1.24 (0.73–1.51)	0.34
Never	728 (36%)	196 (22%)	**reference**	
Facebook Use on Smartphone				
Often	153 (7%)	251 (28%)	0.77 (0.42–1.24)	
Sometimes	714 (36%)	384 (43%)	0.57 (0.27–1.18)	0.11
Never	1126 (57%)	261 (29%)	**reference**	
Whatsapp Use on Smartphone				
Often	197 (10%)	265 (30%)	1.72 (1.26-2.34)	
Sometimes	782 (39%)	345 (38%)	1.41 (1.16-1.72)	**0.043**
Never	1014 (51%)	286 (32%)	**reference**	
Snapchat Use on Smartphone				
Often	103 (5%)	244 (27%)	0.40 (0.25-0.79)	
Sometimes	412 (21%)	368 (41%)	0.62 (0.46-0.89)	0.10
Never	1478 (74%)	284 (32%)	**reference**	
Play Games on Smartphone				
Often	983 (49%)	461 (52%)	1.74 (1.41 -2.11)	
Sometimes	934 (47%)	395 (44%)	1.48 (1.20-1.83)	**< 0.001**
Never	76 (4%)	40 (4%)	**reference**	
Listen Music on Smartphone				
Often	542 (27%)	267 (30%)	2.13 (1.31–3.46)	
Sometimes	1138 (57%)	249 (28%)	1.90 (1.21–2.98)	**0.049**
Never	313 (16%)	380 (42%)	**reference**	
Watch Movies and Videos on Smartphone				
Often	696 (35%)	431 (48%)	1.33 (1.04-1.70)	
Sometimes	1084 (54%)	216 (24%)	1.73 (1.05–2.87)	**0.030**
Never	213 (11%)	249 (28%)	**reference**	
Smartphone Use for Education Purpose				
Often	287 (14%)	349 (39%)	0.89 (0.58–1.28)	
Sometimes	1014 (51%)	315 (35%)	0.41 (0.24–0.91)	0.09
Never	692 (35%)	232 (26%)	**reference**	
Smartphone Use for Alarm Purpose				
Often	941 (47%)	272 (30%)	2.48 (1.34–4.57)	
Sometimes	504 (25%)	305 (34%)	1.97 (1.78-2.58)	**0.001**
Never	548 (28%)	319 (36%)	**reference**	
Smartphone Use For Camera				
Often	382 (19%)	514 (58%)	2.23 (1.49–2.78)	
Sometimes	1194 (60%)	164 (18%)	1.60 (1.07–2.45)	**0.015**
Never	417 (21%)	218 (24%)	**reference**	

Binary logistic regression was used to estimate use of applications on smartphone among 2889 school going smartphone users. The results concluded that highest odds ratio was observed in those school going smartphone users who often use smartphones for messaging i.e. 1.55 (0.79-1.98), odds ratio observed in those who sometimes use smartphone for messaging was 1.33 (0.61-1.50) as compared to those who do not use smartphone for messaging as shown in Table 3.

Highest odds ratio was observed in those school going smartphone users who often use smartphones for calls i.e. 1.49 (0.90-1.80), odds ratio observed in those who sometimes use smartphone for calls was 1.24 (0.73-1.51) as compared to those who do not use smartphone for calls. Highest odds ratio was observed in those school going smartphone users who often use smartphones for Facebook i.e. 0.77 (0.42–1.24), odds ratio observed in those who sometimes use smartphone for Facebook was 0.57 (0.27–1.18) as compared to those who do not use smartphone for Facebook as shown in Table 3.

Among 2889 school going smartphone users, highest odds ratio was observed in those who often use smartphones for Whatsapp i.e. 1.72 (1.26–2.34), odds ratio observed in those who sometimes use smartphone for Whatsapp was 1.41 (1.16–1.72) as compared to those who do not use smartphone for Whatsapp. Highest odds ratio was observed in those who sometimes use smartphones for Snapchat i.e. 0.62 (0.46–0.89), odds ratio observed in those who often use smartphone for Snapchat was 0.40 (0.25–0.79) as compared to those who do not use smartphone for Snapchat. Highest odds ratio was observed in those who often use smartphones for playing games i.e. 1.74 (1.41–2.11), odds ratio observed in those who sometimes use smartphone for playing games was 1.48 (1.20–1.83) as compared to those who do not use smartphone for playing games. Highest odds ratio was observed in those who often use smartphones for listening music i.e. 2.13 (1.31–3.46), odds ratio observed in those who sometimes use smartphone for listening music was 1.90 (1.21–2.98) as compared to those who do not use smartphone for listening music. Highest odds ratio was observed in those who sometimes use smartphones for watching movies and videos i.e. 1.73 (1.05–2.87), odds ratio observed in those who often use smartphone for watching movies and videos was 1.33 (1.04–1.70) as compared to those who do not use smartphone for watching movies and videos as shown in Table 3.

Among 2889 school going smartphone users, highest odds ratio was observed in those who often use smartphones for education purpose i.e. 0.89 (0.58–1.28), odds ratio observed in those who sometimes use smartphone for education purpose was 0.41 (0.24–0.91) as compared to those who do not use smartphone for education purpose. Highest odds ratio was observed in those who often use smartphones for alarm purpose i.e. 2.48 (1.34–4.57), odds ratio observed in those who sometimes use smartphone for alarm purpose was 1.97 (1.78–2.58) as compared to those who do not use smartphone for alarm purpose. Highest odds ratio was observed in those who often use smartphones for camera purpose i.e. 2.23 (1.49–2.78), odds ratio observed in those who sometimes use smartphone for camera purpose was 1.60 (1.07–2.45) as compared to those who do not use smartphone for camera purpose as shown in Table 3.

The results concluded from above Table 3 that significant associations were found smartphone usage and applications use on smartphone among school going children (5–16 years) in Lahore, Pakistan. The p-value of use of smartphone for calls was 0.34 and for messaging was 0.19. The p-value of smartphone use for Facebook was 0.11, for Whatsapp was 0.043, for Snapchat was 0.10, for playing games was <0.001, for listening music was 0.049, for watching videos and movies was 0.030, for education purpose was 0.09, for alarm purpose was 0.001 and for camera purpose was 0.015.

4. Discussion

The study has recognized numerous variables which act as menace for the addiction of smartphones as well as problematic use of smart devices for online activities and social networking websites such as Facebook, WhatsApp, online games and taking photos compulsivity have negative influence on routine life doings and warning sign of tolerance, craving and withdrawal. Billieux *et al.,* (2015), Kardefelt-Winther D (2017) and Lopez-Fernandez O (2017) stated that professionals in behavioral addictions highlight the prominence of generating instruments that were found appropriate for screening and technology-related addictive behavior.

The study has also explored that problematic smartphone use as significant public health significance. Rosen *et al.,* (2013) studied on and off task behaviors of middle and high school as well as university students for 15 minutes. The study findings revealed that students who spent more than 6 minutes in using social networking websites such as Facebook, WhatsApp and doing texting can be the major reason of distraction of students from studying.

The research by Sarfaraz *et al.,* (2015) shows that features in mobile phones such as constant texting, Facebook, Whatsapp, taking pictures and making videos not only leads prolonged use but also takes them towards smartphone addiction resulting in complaints of musculoskeletal as well as hearing problems among teenagers. Thus, study findings revealed that mobile phones are sadistically used among teenagers resulting in facing dire consequences.

The study discovered that gaming on smartphones leads to serious smartphone addiction among individuals. The availability of Internet gaming on computers was narrowed

by device excellence as well as on the availability of Internet; while this issue was not in smartphone gaming posed greater addiction among smartphone users than individual who have Internet addiction. Lin et al (2015) showed that smartphone gaming, with and without the use of multiple apps, increased the risk of smartphone addiction which coincides with the findings of Lin and authors. In conclusion, general gaming is the primary addictive behavior, however the nature of multiple-app use marks warning signs of smartphone gaming addiction different from those of Internet gaming disorder.

5. Conclusion

The study on most used applications on smartphone among school going children (5–16 years) concluded that most used applications on smartphone among school going children (5–16 years) were WhatsApp and used smartphone for playing games, listening music, watching videos and movies, alarm and camera purpose. School going children should avail the benefits of smartphone and should use smartphone more for gaining knowledge and education purpose than using smartphone just for entertainment purpose.

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