

An Analytical Study of Smartphone Addiction among Engineering Students: A Gender Differences

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ABSTRACT

With advent of new Smartphone technologies and the widespread utilization of touch screen mobile phones made humans embrace technology more and depend on it extensively and compulsively in their lives. Due to the new communication technologies and Smart phones the world is becoming a trajectory place where man is not relying on man for its needs but depending more on Smartphone apps which is replacing multivariate structure of human behavior where Smartphone Apps are transforming its functional role as a Guru, Mentor, Family physician, shopping consultant and so on. The present study is exploring the impact of Smartphone User Applications (Apps) on the behavior of the engineering students. This study examined Smartphone user behaviors and their relation to Smartphone addiction. A General Behavioral survey guided by a well structured self design questionnaire has been administered across a sample of hundred students. The questionnaire is comprised of Thirty items measuring amount, duration and pattern of usage of various Smartphone apps specifically health apps, entertainment apps, shopping apps, communication apps, and education apps. Overall test score measuring overall addiction to the Smartphone. A Sample is assigned using random sampling and purposive sampling method. Two groups are divided in fifty male and fifty female across the age ranges from 18- 22 years from various Engineering Colleges to measure gender differences. The test findings showing significant level of difference among the Smartphone addiction across the gender in accordance with usage of various Smartphone apps. The overall trend shows male students are more prone to Smartphone addiction than female.

Keywords: *Smartphone, Smartphone Addiction, Smartphone Applications (Apps), Human Behavior.*

Smartphone is an essential and integral part of campus culture. Even a meager observation of today's college life will reveal Smartphone is being used, both physiologically and psychologically, in every possible campus setting. A Smartphone is a mobile phone with an

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advanced mobile operating system which combines features of a personal computer operating system with other features useful for mobile or handheld use. Smartphone, which are usually pocket-sized, typically combine the features of a cell phone, such as the abilities to place and receive voice calls and create and receive text messages, with those of other popular digital mobile devices like personal digital assistants (PDAs), such as an event calendar, media player, video games, GPS navigation, digital camera and digital video camera. Most Smartphone can access the Internet and can run a variety of third-party software components ("apps"). They typically have a color display with a graphical user interface that covers 70% or more of the front surface. The display is often a touch screen, which enables the user to use a virtual keyboard to type words and numbers and press onscreen icons to activate "app" features.

The latest generation of Smartphone is increasingly viewed as handheld computers rather than as phones, due to their powerful on-board computing capability, capacious memories, large screens and open operating systems that encourage application development. Research suggests that college students breaking the rules by using smartphone frequently during class time. (Tindell & Bohlander, 2012). As Smartphone technology is rapidly developing, the device appears capable of contributing to changes in thinking and behavior of human being. For example, "Smartphone" provide students with immediate, portable access to many of the same education-enhancing capabilities as an Internet-connected computer, such as online information retrieval, file sharing, and interacting with professors and fellow students (Bull & McCormick, 2012; Tao & Yeh, 2013). Inversely, recent research suggests that many college students see the Smartphone primarily as a leisure device, and most commonly use Smartphone for social networking, surfing the Internet, watching videos, and playing games (Lepp, Li, & Barkley, 2015; Lepp, Barkley, Sanders, Rebold, & Gates, 2013).

In support of the "Smartphone as disrupter" hypothesis, a recent study by Lepp et al., in 2013 found that excessive Smartphone use was negatively associated with measure of cardio-respiratory fitness in a sample of U.S. College students. Interview data collected for the study explained the negative relationship by suggesting that Smartphone use disrupts physical activity and encourages sedentary life style. Some data collected as part of the same study suggest that Smartphone use may also disrupt behaviors conducive to academic achievement. For example, when asked to describe Smartphone use habits, one respondent revealed,

"I usually go on my phone if I'm bored sitting there in class. Or during homework I'll take little Twitter breaks." Another student said, If I'm in class and I'm bored then I'll use my phone to look on Facebook. I think it's just kind of a habit now that I have, which probably isn't a good one. But, it's just that I always have it [the phone] on me.

LITERATURE REVIEW

1 Mobile Devices: The Smartphone

Wide ranges of variety of mobile devices are available in market, including tablets, laptops, PDAs and Smartphones. This device varies in sizes, usage, and other function, which leads to differences in use and usage experience (Ghose, Goldfarb & Han, 2010). In this research, only the use of a Smartphone will be considered under the definition mobile device. Because the Smartphone is a most popular mobile device, most people own a Smartphone, it is commonly used, there are a large number of applications available and it is more affordable than a tablet. In addition, due to its small size and numerous functions, this device is utilized around most. Smartphones are carried everywhere: in workplace, at the restroom, at bedroom, at lounges, etc. Therefore, Smartphone devices are different from other technical devices, as they are conducive to creating addiction in human being. (McLuhan, 1964).

Smartphone having unique features, such as screen, size, applications, ubiquity, and flexibility in both space and time (Nielsen & Fjuk, 2010). Therefore, users can access to internet activities for sharing, consumption or exploiting media content any place and time (Okazaki & Hirose, 2009). The Smartphone is an important part of many lives; because of its size and features it is carried around whole day by its owner. A wide range of applications promote the extensive usage of Smartphones and the need of being online throughout the day.(Okazaki & Hirose, 2009). Life without a Smartphone is for many people impossible and implausible; thus, people are getting in some way habitual on their Smartphone (Haverlag, 2013). Thus, the use of Smartphones is deepening to minds and body of human being because it is always accessible and available. This intense usage could lead to addictive behavior (Young, 1999).

2 From Habit to Addiction

The Smartphone is ubiquitously available and accessible with numerous applications that stimulate its continuous utilization. These devices could lead to compulsive and impulsive behavior because of problematic excessive use. (Oulasvirta, Rattenbury, Ma, & Raita, 2011). Online user applications on Smartphones can form habits (Oulasvirta, Rattenbury, Ma & Raita, 2011). How habits do formed and become addictive? Habits are formed through repeated acts in certain circumstances (Oulasvirta et al., 2011). In cognitive research, habits are defined as “*an automatic behavior triggered by situational cues, such as places, people, and preceding actions*”(pg.2) (Oulasvirta et al., 2011). Habits are behavioral acts without self-instruction or conscious thinking. (La Rose & Eastin, 2004). Habits can have both phases of coin as its also having positive and negative effect. (Wood & Neal, 2007). Positive effects seen in fast automatic behavioral aspect, it enables accomplishment of complex tasks and multitasking. Habits give control over behavior in circumstances, where quick anticipation is required. (Wood & Neal, 2007). Habits have unique feature of identification of person as a positive social identity, as habit predicts that person's plan of actions and manifest personality characteristics of a person. (Oulasvirta, et al., 2011; Wood & Neal, 2007). On the other hand, negative influence of habit can

cause unconscious and unintended behavior activated by external or internal cues interfering other acts. This is also called maladaptive habits, as people create excessive urges, for example, unintended Smartphone checking habits. It could interfere with daily life; however, due to regulations or social norms, people are able to control these evil side of smartphone use (Rush, 2011).

Oulasvirta et al. (2011) stated that excessive use of Smartphones can manifest into negative checking habits. Checking habits are automatic actions whereby the Smartphone is unlocked to check the start screen for new messages, notifications, alerts, and application icons; these habits can be triggered by internal (emotional state, urge) and external (ringtone) cues. Those habits can be maladaptive and interfere with people's social, personal and professional life. Checking for information can be reinforcing, if someone has a new message or notification, the so-called new information reward. Rewards can enforce a repeated action which leads into habits. (Everitt & Robbins, 2005).

3. Addiction

Addiction is any kind that is traditionally associated with an uncontrollable urge accompanied by loss of control, preoccupation with its use and use despite the negative consequences. It's having a long history with reference to alcohol or drugs abuse arising from the addictive effect that those substances have on the human body and brain. However, consumption of large amounts of drugs or alcohol for a long period are not the only types of addiction but its having two kinds specifically chemical and non chemical also called as behavioral.(APA, 2001). People can develop addictions not only towards substances, but also to specific behavioral patterns (APA, 2001). The positive reward of a substance or behavior, the time between consumption or effect, and physiological response determines how addiction originates (Carbonell, Oberst, & Beranuy, 2013). Thus, when the positive reward is strong, there is a short time between physiological action and a corresponding physiological response; as a result, that stimulus becomes more addictive.

4. Behavioral addiction

Behavioral addictions are different from chemical addictions such as alcohol or drugs, its form of addiction that involves a compulsion to involve in highly reinforcing non-drug related activity, interest or behavior despite the knowledge of negative consequences to persons social, personal and professional well being. Drugs addictions are not behavioral addiction but are termed substance dependence (APA, 2001). Behavioral addiction can be defined as "*a disorder where behavior (only) functions to produce pleasure and to relieve feelings of pain and stress in which a person:*

- *Fails to control the behavior;*
- *Continues to execute (addictive) behavior despite significant harmful consequences".*

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In almost all the addictive behaviors irrespective of drug or non drug related addictions, dopamine and serotonin release is responsible for the reward and pleasurable feeling of behavior. In behavioral addiction, a specific behavior that gives the pleasant feeling and relieves the feeling of stress and pain is repeated often. In the addictive behavior, dopamine and endorphine are being released (Everitt & Robbin, 2005). In absence of pleasurable behavior, dopamine is still released in the anticipation of the reward as a conditioned response; therefore, internet and Smartphone are conditioned stimulus to generate addictive tendency in human being. (Everitt & Robbin, 2005).

The diagnostic criteria for behavioral addiction are similar to other types of addictions (APA, 2001). The following symptoms are given in Diagnostic Classification DSM-IV-TR (2001) addictions: A maladaptive pattern of Internet use, leading to clinically significant impairment or distress as manifested by three (or more) of the following, occurring at any time in the same 12-month period, is all that is required to diagnose a person as having Internet Addiction Disorder:

(I) tolerance, as defined by either of the following:

- (A) A need for markedly increased amounts of time on Internet to achieve satisfaction
- (B) Markedly diminished effect with continued use of the same amount of time on Internet

(II) Withdrawal, as manifested by either of the following

The characteristic withdrawal syndrome

- (1) Cessation of (or reduction) in Internet use that has been heavy and prolonged.
- (2) Two (or more) of the following, developing within several days to a month after

Criterion 1

- (a) Psychomotor agitation
- (b) Anxiety
- (c) Obsessive thinking about what is happening on Internet
- (d) Fantasies or dreams about Internet
- (e) Voluntary or involuntary typing movements of the fingers

(III) Internet is often accessed more often or for longer periods of time than was intended

(IV) There is a persistent desire or unsuccessful efforts to cut down or control Internet use

5. Smartphone Addiction

Whang, Lee, and Chang (2003) defined internet addiction as “an impulse-control disorder with no involvement of an intoxicant; therefore, it is akin to pathological gambling” (pg. 144).

Internet addiction is closely related to Smartphone addictions as features are quite similar (Kwon, Kim, Choi, Gu, Hahn & Min, 2013). Smartphone addiction mostly begins with habits such as the late log-ins, habit of checking notification, messages, status; Technology addictions are seen as a behavior to gain pleasure, relieve pain or escape from the reality (Huisman, Garretsen, & van den Eijnden, 2000). Therefore, using excessive internet use and keep checking

cellphones can be habitual phenomenon, such as watching videos, playing games, visiting social media or forums (Young, 1999).

People often use Smartphone every day, every time everywhere, do not switch off of their Smartphone even while sleeping, do not go out without them, and use them for work, study, relaxation, and socializing. Excessive cell phone usage can lead to addictive behavior (Wood & Neal, 2007; La Rose & Eastin, 2004). People having huge extension to the Smartphone, desktop or laptop computer compared to the fixed telephone. (Carbonell, Oberst & Beranuy, 2013). This is particularly more found with adolescents, as they spend more time on their cell phones because adolescents are more sensitive to rewards gain and more prone to modify their habits and behavior according to external and internal cues than older people (Haverlag, 2013).

Smartphones have Ten features that can act as a strong positive reinforcement. (Carbonell, Oberst, and Beranuy, 2013) witnessed the unique features of Smartphones that can cause positive reinforcement to users, viz:

1. Text messages, calls, or updates from social networking sites creates a feeling of being valued or loved can be *euphoric* to users.
2. Smartphone function as a daily planner, calculator, clock, camera, audio/video recorder, radio, music player, navigation and so on. *An instrumental function of Smartphone is essential for everyday requirement.*
3. Smartphones function as an *identity symbol* of its user. This is not only dependent on brand, size, shape and cost of mobile device, but also by the number of messages, notifications, and calls a person receives. It can be act as a *symbol of status* in public places to showcase a user's identity.
4. Smartphone create and maintain *social networks*. Social networks that are different from those created by face-to-face communication. Adolescents and Teenagers are fonder of creating online social network via Smartphone.
5. Due to the identity and social network implications of Smartphones, users get *dependent* of their Smartphones. Staying online for hours with creates a *feeling of dependency*.
6. Smartphones make it *easy to connect* to the online world; therefore, it is possible for users to connect with people/peers worldwide.
7. Due to the easy accessibility of Smartphone, people are getting habitual of device on large extent. Without a Smartphone, a feeling of fear can develop. Smartphone is creating *control* on cognition and connation of human being
8. Smartphone are always in hand for many individuals, it is expected that others are also *permanently connected* and accessible. This leads to a feeling of concern when people do not react in time. It develops emotional bonding in human relations.
9. Numerous applications are available on Smartphone; thus, the device can function as a *reservoir of apps* to fulfill quick needs of human being. Smartphone can offer shopping, browsing, and watching multimedia, gaming, education information, etc.

10. Smartphone provides function like calling, text messaging, communication applications, and social media make it *easy to express or share feelings, experiences* to the other being via audio, video or text.

In sum, Smartphone addiction can develop through habits; these habits can become maladaptive (i.e. function as an escape mechanism from reality. Smartphone addiction is a behavioral addiction that negatively affects person's occupational, social and interpersonal life. Smartphone addiction is evolved through intense behavior example, checking, posting, or interacting on social media platforms. If the Smartphone or application will be removed from the addicted person, panic attacks or feelings of discomfort emerge (Young, 1999; Huisman et al., 2000; Shaffer, 1996). Based on the properties of the Smartphone it can be assumed that excessive Smartphone use can form a Smartphone addiction.

6. Gender Difference in Smartphone Usage

Women are more socially oriented compared to men proved by various studies. (Lee, Chang, Lin & Cheng, 2014). Women call talk on phones for longer time than men do including phone calls to family members, relatives, friends, customer services, and sales calls (Friebel & Seabright 2010). There are huge differences between usage of internet and smartphone in male and female according to gender studies (Pawłowska & Potembska, 2012). Women use the device more for social gratifications and reinforcements rather males use the smartphone for more process-oriented gratifications. Women indulge in chatting and messaging more than men to 'gossip' or maintain social relationships and have a stronger attachment with their cell phones. Therefore, online chatting, communication and messaging apps, social networking apps are most appealing to women (Duggan & Brenner, 2012). Men are more prone to online gaming and gambling usage on Smartphone.

However, there is controversial studies in role of gender and technical addiction. In a Spanish study of Jenaro, Gomez-Vela, Gonzalez-Gil, and Caballo (2007), female internet addicts showed a stronger correlation with social anxiety. Some other studies did not find significant gender differences in smartphone and internet addiction (Rush, 2011). By contrast, Frangos, Frangos, and Kiohos (2010) detected that males are more likely to use internet due to gambling, playing games, and watching porn. Ko et al. (2005) established that males are more likely to be game addicts and Lower self-esteem and lower daily life satisfaction were strongly associated with game abuse in men but not in women. Finally, contradictory findings provide poor support to the about significant gender differences in Smartphone and internet addiction. However, women and men becomes addicts in different ways due to different usages, different motivations, and different interests in usage gratifications.

METHODOLOGY

Participants

The participants of this study were 100 students of engineering discipline age ranged from 18-22 years with mean age of 20 years which is equally divided into 50 male and 50 female. The sample was assigned through random sampling method. The study was conducted after the written consent of the participants.

Measurements

The self design questionnaire was administered on respondents consisted of 30 items which covered 5 variables viz. Usage of health apps, entertainment apps, shopping apps, communication apps, and education apps. Overall test score measures the level of addiction to Smartphone as a whole. The participants were asked to mark the responses on the basis of appropriate rating. The main aim of this study was to identify or examine the gender difference in usage of various Smartphone apps and dependence to Smartphone as a whole. Based on the test scores, maximum score to be obtained on test is 132 and minimum score is 0. On the basis of scores, three categories were drawn as a Norm for the purpose of interpretation and analysis of Test scores. These categories are Low level of Smartphone addiction, Moderate level of Smartphone addiction and High level of Smartphone addiction.

Procedures

The participants were assigned randomly through the facebook, Whatsapp, Email and a numeric platform available to engineering students of various colleges. All participants were informed of confidentiality and anonymity of their responses and agreed (by ticking the appropriate box) to give their free and informed consent. This study has been performed in accordance with the 1964 Declaration of Helsinki and its later amendments, that's why only participants who gave their consents were included in study. The present paper tries to study the impact of various Smartphone apps among the engineering students with reference to the health, entertainment, education, shopping and communication apps and exploring the dynamics of dependency on apps and Smartphone, holistic exploration has been made by asking students to fill the questionnaire by ticking in appropriate box.

Statistical Analysis

All analysis was performed using SPSS version 20 and MS-Excel 2010. Descriptive analyses were performed independently for total number of participants, male and female. T-test: Two-Sample Assuming Unequal Variances was used to assess and compare the gender inequalities of the respondent and is respectively detailed in Tables.

RESULTS

Descriptive Statistics

Table 1 showing distribution of Smartphone addiction across male and female students where findings revealed that 16 % respondents come under the moderate level of Smartphone addiction. Out of which only 5 (10%) male were having moderate level of addiction to Smartphone whereas 11 (22%) female were falls into this category. Total number of 84 % participants were comes under High level of Smartphone addiction where 45 (95%) candidates were male and 39(78%) were female candidate posing the risk of being in this category.

Table 1: Table showing Distribution of Smartphone Addiction across the gender.

Score Range	Level	Male	Female	Total
0-44	Low Level	0	0	0
45-88	Moderate Level	5	11	16
89-132	High Level	45	39	84
Total		50	50	100

Table 2 revealed that mean score of total no. of students is 77.9 with standard deviation of 9.36 where male students having mean of 80 and standard deviation of 10.18 and female students having mean score of 75.42 with standard deviation of 7.92.

Table 2: Table showing Descriptive Analyses of Smartphone Addiction study.

Unit	Male	Female	Total
Mean	80	75.42	77.9
Standard Deviation	10.18	7.92	9.36

Table 3 showing descriptive statistics for male students according to the study variables viz, Smartphone dependency, Health Apps, Communication Apps, Entertainment Apps, Shopping Apps and Education Apps. Items covering Smartphone dependency are 10 with Matrix scoring system leading to the maximum score of 46. Mean score of male is 26.96 with Standard deviation of 3.57. Health Apps items are 3 with maximum score of 13. Mean score on health variable is 8.38 with standard deviation of 2.09. Items on communication and dating apps are 6 with maximum score of 25. Average score of male students 15.38 with SD of 2.69. Entertainment Apps items are 2 with maximum score of 10. Mean of items covering Entertainment apps are 6.28 with SD of 1.84. Items on Shopping Apps are 5 with maximum score of 25. Mean score is 16.26 with SD of 2.08 Items covering education Apps are 4 with maximum score of 8. Average score male students getting on this variable is 3.54 with SD of 1.47.

Table 3: Table showing descriptive analyses according to the study variables among Male.

Unit	Smartphone Dependency	Health Apps	Communication Apps	Entertainment Apps	Shopping Apps	Education Apps
Mean	26.96	8.38	15.38	6.28	16.26	3.54
Standard Deviation	3.57	2.09	2.69	1.84	2.08	1.47

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Table 4 showing descriptive statistics for study variables of Female students. Items covering Smartphone dependency are 10 with Matrix scoring system leading to the maximum score of 46. Mean score of female is 25.92 with Standard deviation of 2.26. Health Apps items are 3 with maximum score of 13. Mean score on health variable is 7.78 with standard deviation of 1.89. Items on communication and dating apps are 6 with maximum score of 25. Average score of female students 13.94 with SD of 2.49. Entertainment Apps items are 2 with maximum score of 10. Mean of items covering Entertainment apps are 6.42 with SD of 1.45. Items on Shopping Apps are 5 with maximum score of 25. Mean score is 15.5 with SD of 2.30 Items covering education Apps are 4 with maximum score of 8. Average score female students getting on this variable is 3.66 with SD of 1.50.

Table 4: Table showing descriptive analyses according to the study variables among Female.

Unit	Smartphone Dependency	Health Apps	Communication Apps	Entertainment Apps	Shopping Apps	Education Apps
Mean	25.92	7.78	13.94	6.42	15.5	3.66
Standard Deviation	2.26	1.89	2.49	1.45	2.30	1.50

Differences between male students and female students

Table 5 showing T-test statistics to assess and compare gender difference between scores of Male and Female students. Because the absolute value of the T-stat is greater than t critical two tail as well as t critical one tail or because the probability that the null hypothesis is true is smaller than alpha therefore, we can reject the null hypothesis that there is no statistical difference between the two dataset and it is proved that there is significant difference between male and female scores on test.

Table 5: Table showing T-test between scores of male and female.

Unit	Male	Female
Mean	80	75.42857143
Variance	103.7916667	62.875
Observations	49	49
Hypothesized Mean Difference	0	
df	91	
t Stat	2.478709342	
P(T<=t) one-tail	0.007514448	
t Critical one-tail	1.661771156	
P(T<=t) two-tail	0.015028896	
t Critical two-tail	1.98637711	

DISCUSSION

The current study focused on gaining insight into how excessive use of Smartphone relates to changing dynamics of human behavior as well as uncovering the psychological variables that might be responsible for the dependency to the Smartphone apps usage. Our hypothesis were partially supported as results revealed that 45 male students comes under high level of addiction and 39 female are there in this category which indicates that male are more prone to Smartphone addiction but contrary to this only 5 male are there in moderate level but female are more (11) than male which is showing female are also in high verge of getting addicted to Smartphone. Mean of male (80) is more than female mean (75.4) which is also showing significant difference in both mean and proving that male are more on risk than female. As per the study variables, Health apps mean for male (8.38) is more than female (7.78) mean score. Communication apps mean score for male is 15.3 which greater than female mean score 13.9. Entertainment app score for male and female students are 6.28 and 6.42 respectively. Mean score on shopping apps is more in male that is 16.26 than female (15.5). Interestingly education apps score for female students (3.66) is more than male students (3.54). Theoretically explanations for the obtained results present an interesting dynamics of apps dependency among engineering students. As obviously seen, male students score significantly more on holistic Smartphone dependency; also there mean score for sub variables for Health, Communication and Shopping Apps was slightly more than the female students. Only for education apps and entertainment apps the mean score of female students was slightly greater than the mean score of male engineering students. The study finding though focused on the gender difference with reference to Smartphone dependency, overall picture project an alarming condition among the students. The cluster dynamics ranging from Entertainment, Communication and Health project strong interpersonal and bilateral relationship but in the present case it was seen that the propensity of using Smartphone apps among the engineering students has changed the behavioral dynamics. These students preferred to use customized Apps which are easily available on their Smartphone and thus substitute the cardinal basic need of interaction. Even for mundane communication, information sharing about academic projects or for sharing advanced academic research assignments, students were found to use Whatsapp and Facebook Messenger, though the physical proximity among the hostel inmates had easily made it possible to connect but its seen than traditional person to person contact has taken over the new form of communication were customized need based apps satisfies the given need or desire. Interestingly it was seen than for health related Apps, students were significantly relying on it rather than horning of outdoor expertise, participation in game and sports and sweating out in the gym. The finding of the present paper also indicates the significant use of communication app among the male student compare to the female students. It was observed in the present study that average engineering male student is member of more than 15 whatsapp group. These groups ranging from parents, relatives, classmate and school buddies, immediate senior, club members, project partners and hostel inmates. Also it was found that male students forward more whatsapp messages instead of exchanging information on trivial pleasantries. Whereas when the female students were asked to elaborate their Smartphone usage,

majority of the girls opined that they watch Ted videos, Youtube, listen to music even when they are studying it was further found that propensity to change Dp's on Whatsapp, Facebook and Instagram was more among the female engineering students. If we consider shopping paradigm, test findings are contrary to real life experiences as female having high tendency to roam around markets, roadside accessories vendors, shopping malls in real life but when it comes to virtual life findings showing male use more shopping apps. Shopping might not be exclusively related to apparel, fashion accessories and clothing it depends on gender on their choices of shopping. Male are fonder of books, electronics appliances, gadgets, laptops, androids, numerous technical devices. Female shopping is restricted to fashion accessories, clothing, footwear, bags and so on. Online shopping apps are more utilized by male students to fulfill their desire of buying vibrant technical and electronics devices. Findings also discovered that Smartphone addiction seems to serve as an impediment to undergraduates' academic performance. Although we do not advocate for the ban of the use of Smartphone on campus given that it could also facilitate learning if used for learning purposes, we however concur with Levine et al. (2007) by urging Smartphone users not to use such phones exclusively for leisure purposes on campus because it can be distractive to learning. Thus, school management could prevent or minimize the negative impact of Smartphone addiction on their students by taking proactive steps at preventing or minimizing the occurrence of Smartphone addiction through sensitization program on the dangers of being addicted to their Smartphone.

CONCLUSION

The present study tries to study the impact of various apps among engineering students with reference to health, education, shopping entertainment and communication apps. The study explores the dynamics of dependency on apps and Smartphone addiction. The study was guided by general survey on the screening of Smartphone addicts as well as their propensity to use various types of Apps. We found that male students are more prone to Smartphone addicts compare to female students. Female students also equally posing risk increasing in utilization of Smartphone in near future. Nevertheless it's observed that utilization and dependency to use Smartphone apps is more in male than female like health, communication, shopping apps nonetheless female use education app more than male.

Declaration of Conflicting Interests

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