Smartphone Addiction: Dysfunctional Coping, Maladjustments and Maladaptation

Sarita Mishra Kolhe

Income Tax Department, Ministry of Finance, Government of India, New Delhi, India

Email address:

dr.saritamishra9@gov.in

Abstract: One of the most pervasive technological devices in the world are the smartphones. The features and applications of a Smartphone have turned it into a portable personal computer. The New York Times, The Economist and the Harvard Research Journal have coined the expression "Dopamine Squirt" to describe the drug like effect of connecting to technological devices being a smartphone. Some of the dysfunctions of smartphone addiction are reported to be disruption of social communication, family relationships and close bonds, sleep disruption, poor academic performance and disruptive work relations leading to maladaptation and maladjustment to the environment. Numerous researches have highlighted that there are a plethora of adverse impacts due to smartphone addiction which takes a toll not only on family relationships and close bonds but also on the physical and mental health including nervous disturbances; weakening of the immune system; problems with the eardrum; experiencing pain in the wrist, neck and joints; fatigue, sleep disorders and brain tumor. There is evidence that children's cognitive development can be damaged by prolonged internet and smartphone use, including the development of memory skills, attention span, abilities for critical reasoning, language acquisition, reading, writing skills and learning abilities. Paradoxically, people are driving at a break-neck speed, connected to the world via GPS technology, yet they are disconnected from their own sense of purpose and direction. Deep thinking, contemplation as well as introspection are getting lost sight of, and are being overlooked in this instantaneous culture. The maladjustments and maladaptation due to smartphone addiction has overarching ramifications both horizontally and vertically, as it leads to several adverse impacts on the physiological, psychological, sociological, emotional, behavioural, attitudinal as well as the mental health of the smartphone addicts. The harmful impact of smartphone addiction on the cognitive, behavioural and attitudinal aspects of human functioning cannot be underestimated. The negative outcomes of smartphone addiction on the minds of teenagers, adolescents as well as young adults are pervasive and permeates different aspects of human functioning which needs to be dealt with in a holistic manner by various stakeholders, incorporating exercise of discipline, a sense of control over smartphone usage as well as dedicated interventions by parents, guardians, educators, and individuals themselves so that the dysfunctional coping, maladjustments and maladaptation are reduced to a significant degree in order to foster effective adaptation to the environment.

Keywords: Smartphone Addiction, Internet Addiction, Maladjustment, Maladaptation

1. Introduction

The 21st century has witnessed several new challenges such as climate change, viral pandemics, infrastructural bottlenecks, aging populations and various kinds of socio-economic crises. Digital revolution has proven to be a boon to various sectors of the society. A new digital revolution is taking shape with the emerging generation of Artificial Intelligence, Automation, Internet of Things (IoT), Internet-based Robotics and Wearable Technology designed to improve the society at large. Personalization is quickly emerging as the keyword of the next phase of digital revolution: "Society 5.0" which is gaining momentum in Japan. Although some of the advancements sounds like Hollywood stuff, yet a fantastic new world is already taking shape with the investment in CASE (Connected, Autonomous, Shared, Electric) systems which would impact and impart a new way of looking and doing things. The advancements in the field of digital technology have undeniably added higher value to products and services,

however, the human value systems, familial ties, cultural-conditioning, adding more meaning to life is getting diluted significantly. By combining internet services as well as various services of a mobile phone, smartphones have become indispensable and irreplaceable by the users. However, excessive usage of the smartphone has led to smartphone addiction which has several adverse impacts on the cognitive, behavioural and attitudinal aspects of human functioning. This paper is an attempt to throw light on the dysfunctional coping, maladjustments and maladaptation due to smartphone addiction which is a cause of concern globally.
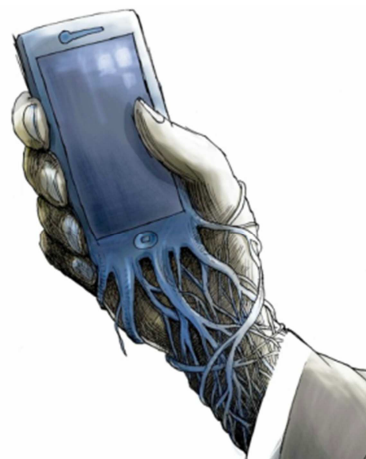
2. Method

A review of the dysfunctional coping due to smartphone addiction was carried out based on several research and scholarly articles on the subject.
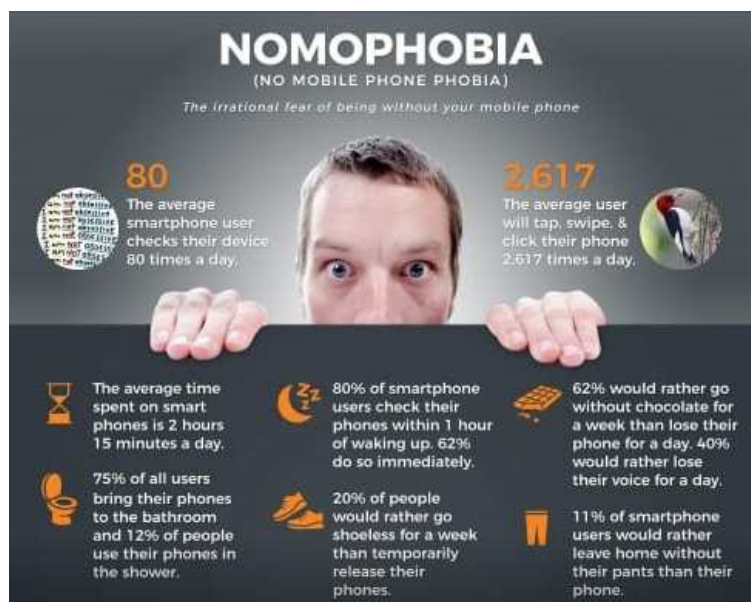
2.1. Nomophobia

Nomophobia refers to (No Mobile phone Phobia) which is

characterized by a psychological condition when people have a fear of being detached from mobile phone connectivity.

Source: Internet

Figure 1. *Pictorial depiction of Nomophobia on the rise.*

Source: https//strategus.com [68]

Figure 2. *Depicts the Infographic Chart regarding the Rise of Nomophobia Among Smartphone Users.*

2.2. Smartphone as an Indispensable Device

One of the most pervasive technological devices on the planet are the smartphones. A smartphone is a cellular telephone which has inbuilt application and internet access which provides services such as text messaging, web browsing, email, still and video cameras, MP3player, video telecom and calling alongwith a host of other features. These features and applications of a Smartphone have turned it into a portable personal computer. Smartphones offer innumerable information and interactive access that are customized and relevant according to the needs of an individual. It is estimated that 90% of the world now and 80%

of those living in rural communities have the mobile network at their finger-tips [25]. TIME surveyed around 5,000 people in eight countries in 2012. The survey findings revealed that the majority of the surveyed population could not go without their smartphone for even a day and one-third of them stated that they could go without their smartphone for only a few hours which shows the over-dependence and addiction to smartphones.

Smartphones offer endless flow of real-time data as well as various social networking services such as Facebook, Instagram, Twitter and other social medias that are literally at the finger-tips so as to give the most recent update. The New York Times, The Economist and the Harvard Research Journals have coined the expression "Dopamine Squirt" to

describe the drug like effect of connecting to technological devices such as a smartphone [65]. Due to the severity associated with smartphone addiction, there are proposals for including Nomophobia (No Mobile Phone Phobia) in the latest version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V), [3] as a mental disorder characterized by a psychological condition when people have a fear of being detached from mobile phone connectivity [10].
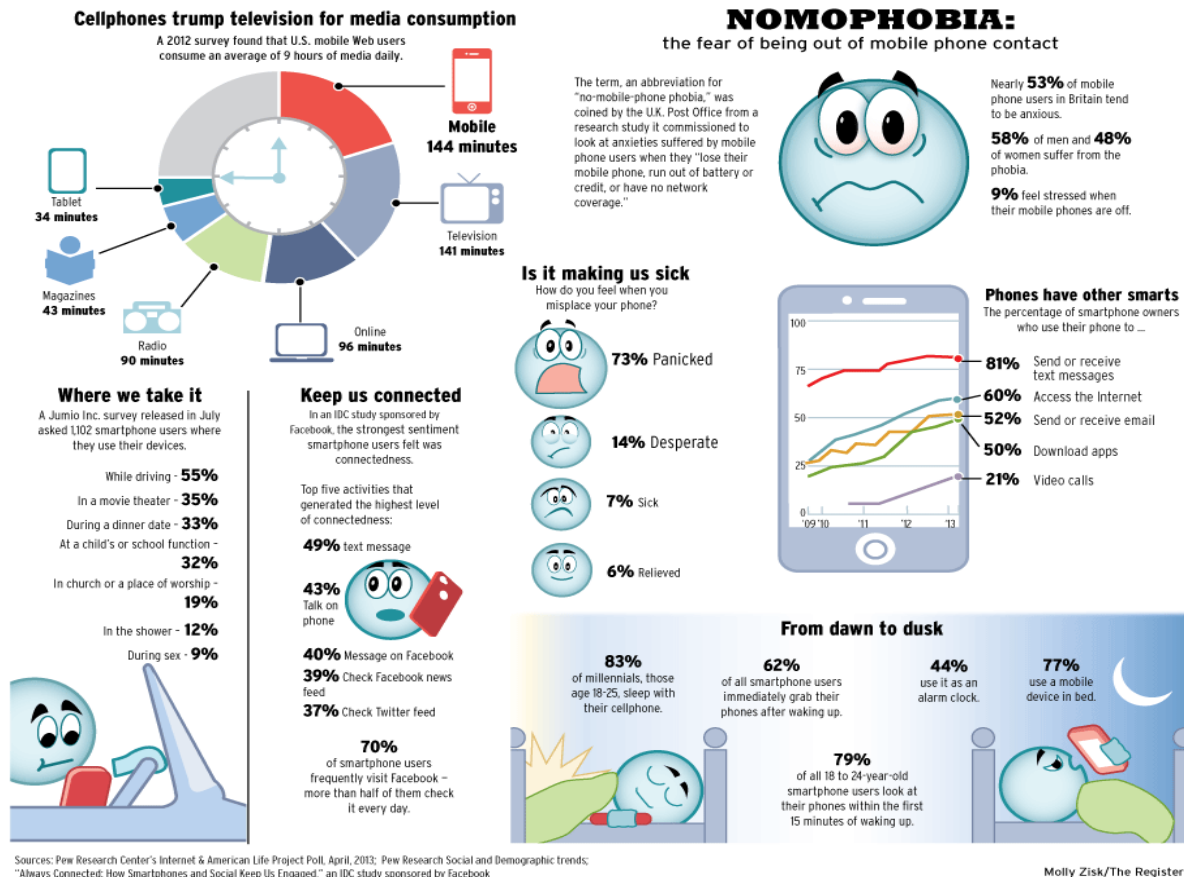
Source: Pew Research Center's Internet and American Life Project Poll, April 2013 [57]

Figure 3. Depicts the Pew Internet Survey on Internet Activities.

There is a profound impact of smartphone on the users. Smartphones have emerged as a vital part of the existence of individuals and is considered to be an extension of the individual which most people cannot live without. Even if smartphone have made lives easier in diverse dimensions, however, the negative impacts of smartphones addiction are numerous which is a cause for concern globally. Some of the dysfunctions of smartphone addiction are reported to be disruption of social communication, family relationship and close bonds, sleep disruption and poor work relations [46] leading to maladaptation and maladjustments within the family and society at large.

2.3. Utility of the Internet / Smartphone

The Internet offers immense utility, such as making e-commerce convenient, quick access and dissemination of various kinds of information having immense utility for a wide range of products and services, instant contact and communication, emotional support, and entertainment [37, 48]. By combining the services of the Internet and a mobile phone, smartphones offer various services which are qualitatively and quantitively different, in addition to the utility offered by the Internet. Smartphones are used for accessing various kinds of information, entertainment, sports, news, movies, messaging, audio / video calls, facetime and a host of other services. The convenience and user-friendliness that a smartphone offers, make it possible to use it anywhere, for any duration. Worldwide, smartphones are used by more than 2.87 billion people [67]. Although smartphones offer several conveniences in the lives of individuals, yet it is neither insulated nor immune from the adverse effects of smartphone addiction which pertains to the uncontrollability

of smartphone usage leading to a host of physiological, psychological, sociological, emotional, behavioural and attitudinal problems [31]. The high risk group for smartphone addiction constitutes the teenagers, adolescents and young adults. There exists a strong attachment and over-dependence especially among the teenagers, adolescents and young adults to their smartphone as they are heavily dependent on the smartphone for their needs and requirements. It has been reported by many smartphone users that their life is unthinkable and unimaginable without a smartphone [78].

Smartphone addiction refers to the failure or inability to regulate one's habit of overuse of the smartphone, resulting in various physical, social, emotional, behavioural, psychological and attitudinal problems in daily life. Technology related addictions are also referred to as non-chemical addictions and have been classified as a behavioural dependency which induces and reinforces some of the features associated with addictive tendencies. Addictive tendencies include intolerance, withdrawal, interference and relapse. Addiction can cause a person to feel bad and low when they are not doing that preferred activity, and they have the urge to need more of the thing to get the identical high.

2.4. Impact of the Internet on Society

It can be stated with conviction that the entire humanity is now connected to the internet!

It has been postulated that about 95% of all information available has been digitized and made accessible via the internet. The internet has also led to a complete transformation in communication, availability of knowledge as well as social interaction. However, as with all major technological changes and advances, there are positive and negative effects of the internet on the society too.

Some of the positive impact of the Internet on society includes the following:
1) It provides effective communication using emailing and instant messaging services to any part of the world.
2) Entertainment quotient is varied and high.
3) Improvement in business interactions and transactions, saving on vital time.
4) Banking and shopping online have made life less complicated.
5) Access to the latest news, sports, movies etc. of any part of the world without depending on the TV or newspaper and other audio-visual medium.
6) Huge boost in the field of education, as uncountable books and journals are available online from libraries across the world. This has made educational activities and research easier. Students can now opt for online courses using the internet.
7) Application for jobs has also become easier as most vacancies are advertised online with online application becoming the norm.
8) Various professionals / business ventures and other entities can now exchange information and materials online.
9) Booking of e-tickets, e-commerce etc. have made lives easier and saves precious time and efforts.

Some of the negative impact of the Internet on society includes:
1) Easy availability of illegal or inappropriate materials online that isn't age- suitable.
2) Addiction to social networks can disrupt an individual's life and relationship, both personally and professionally.
3) Misuse of the internet for spreading hate and terrorism, are two dangerously catastrophic scenarios, along with a host of connected issues.

However, those indulging in misusing the internet are few and far between. On a global scale, the internet has been the best thing to have happened to human society in recent years!

3. Smartphone Addiction

Smartphone addiction is rooted and parallel to Internet addiction as both are akin to each other in as much as, the symptoms and adverse effects are related. Smartphone addiction is due to the inability to control the impulse for excessive use of smartphones which can be categorised as a disorder mainly due to the pathological and excessive usage of the Internet [26, 83]. As smartphone addiction has been categorized as a behavioural addiction like Internet addiction, it leads to numerous behavioural adverse effects. Both behavioural and chemical addictions share many core symptoms such as salience, tolerance, mood modification, conflict, withdrawal, problems and relapse [27, 29]. There are four features of smartphone addiction, that is compulsion, functional impairment, tolerance, and withdrawal. It has been suggested that smartphone overuse is associated with psychological symptoms which constitutes a form of behavioural addiction [8].

Smartphone addiction is also considered to be a technological addiction that involves human-machine interaction [29]. Media addicts find it difficult to manage real-life activities leading to maladjustments and maladaptation to the environment [28, 83]. Extended periods of internet use lead to inadequate, improper and unfulfilling family and social relationships and higher level of loneliness [52]. Children displayed a wide range of behavioural problems such as nervousness, anxiety, mental distraction and intolerance when they used the smartphone for long periods of time which worsened when the children had begun to use the smartphone at an early age [21]. The *Diagnostic and Statistical Manual of Mental Disorders* (DSM-V, American Psychiatric Association, 2013) [3] have introduced the diagnostic criteria for internet gaming disorder and encouraged further research for listing it as a formal diagnosis. There is limited cognizance that repeated use of the smartphone can be problematic [53]. Generally, people are unaware that excessive usage of a smartphone can be annoying, addicting, "a trap" as well as distracting which can lead to various kinds of risks. Hence, the awareness of the severity and magnitude of smartphone addiction can therefore, play a critical role in its prevention. Satisfaction in life stems from feelings of subjective happiness or personal contentment which can go haywire and get derailed with any

addictive tendencies including smartphone addiction [20, 64].

Depressive symptoms and substance use is also linked to addiction to media which has the potential to flatline well-being. Smartphone addiction affects life satisfaction via perceived stress and academic performance [30, 62]. Generally, women use the internet / smartphones mostly for social purposes while males do so for downloading various kinds of programmes, getting information and for visiting pornographic sites [74, 82]. There exists a gender difference in adolescents' use and attitudes as far as smartphone / computers and Internet are concerned [43, 60]. However, both the genders use the smartphones apart from functional use for entertainment purposes.

Due to lack of adequate self-control in smartphone use, teenagers and adolescents are at a higher risk of smartphone addiction as compared to adults. Most often than not, it is seen that adolescents who have working parents are more prone to smartphone addiction, due to lack of adherence to controlled use of the smartphone as well as lack of timely and proper guidance from significant others who can monitor, supervise, advise and guide them. The technological and content-related features of a smartphone makes it addictive which is further heightened by the easiness of operation, connectedness, accessibility, portability, user interface, video player, design, music, navigation so on and so forth [53].

Physical as well as psychological health and well-being are affected significantly due to smartphone addiction [1]. Individuals with depression and/ or anxiety tend to use the smartphone as a coping mechanism to deal with depression and/ or anxiety as well as other negative emotions [36]. It is ascertained that individuals addicted to smartphone engage in checking behaviours and react to notification sounds more frequently which is also a characteristic of depression and anxiety [18, 23]. A longitudinal study on heavy users of a computer, social media and smartphone showed greater level of prolonged stress, depression and sleep disturbance [71]. Excessive smartphone use at night could keep one awake till late hours leading to insomnia, by impairing sleep which further leads to depression, anxiety and stress [44]. There exists a strong correlation between screen time and internet usage with sleep habits and symptoms of insomnia [12]. Outdoor light at night (LAN) is correlated with eveningness in adolescents [77]. SNS (Social Networking Service) addicts have been reported to show sleep quality that is poorer than non-SNS addicts did [80].

3.1. Adverse Impacts of Smartphone Addiction

There are a plethora of adverse impacts due to smartphone addiction which takes a toll not only on family relationships and close bonds but also on the physical and mental health. Numerous studies have highlighted several adverse impacts of smartphone addiction which includes nervous disturbances; weakening of the immune system; problems with the eardrum; experiencing pain in the wrist, neck and joints; fatigue, sleep disorders and brain tumor [2]. Although, excessive use of the smartphone leads to various health-related concerns, yet deprivation of the smartphone may also

cause various health-related problems which can either be psychological / physiological or both. Individuals addicted to smartphone feel distressed when deprived of their smartphone for some time. Feelings of anxiety, depression, anger and sleep disturbances have been exhibited by adolescents when their smartphones were switched off [72].

3.2. Addiction to the Internet and Associated Problems

There is a variance between Internet addiction and problematic internet use across different cultures. The noteworthy discrepancy in prevalence estimates are with reference to the causes, demography as well as the various diagnostic tools and assessment criteria utilised. The gravity of the matter warrants a need for immediate attention as well as a need for exercising self control and discipline to regulate the use of the smartphone. Offering information, screening tools and campaigns to students in secondary schools and at universities regarding internet- use- related addiction problems can help, especially regarding gaming addiction in adolescent populations. This will require allocating resources for schools and their staff, and for families, as well as the establishment of working relationships with health professionals, counsellors and services.

3.2.1. Consequences of Smartphone Addiction: Few Takeaways

There are numerous studies which have explored the effects of smartphone addiction. The growing research in this arena is generally about the nature of smartphone addiction [54] causes of smartphone addiction, the influence of smartphone dependency on individual's psyche [14], academic performance [45], behavioural issues [79], and issues connected to health [71]. Studies related to smartphone addiction were conducted to identify the relationship between smartphone addiction and factors such as academic performance, gender and age. The factors that affect and impacts relationships are smartphone addiction and numerous interpersonal issues [59], poor emotions such as depression [79] and anxiety [32]. In general, smartphone addicts are extra sensitive to interpersonal relationships and experience more negative emotions than non-addicts. Several studies have shown that extroversion and anxiety can significantly predict smartphone addiction [8].

3.2.2. Negative Impacts of the Internet / Smartphone Addiction on Children / Teenagers / Adolescents

Few negative impacts of internet / smartphone addiction particularly on children / teenagers / adolescents are as under:

Being anxious, sad and feelings of depression:

Children / teenagers / adolescents who spend most of their time in the virtual world tend to withdraw from reality, feel disconnected and lost. Teenagers as well as adolescents become hooked and dependent on the internet to feel upbeat, accepted, and heard, they experience anxiety, sadness, and depression when they are unable to access the Internet. This induces a state of maladaptation and maladjustment to the environment.

Inability to stick to schedules:

Teenagers and adolescents make use of the internet to search for various kinds of information, for correspondences, payment of bills, and for doing some financial transactions. However, in the case of internet addicts as they spend most of their time engaged in browsing, chatting, or gaming, instead of doing what they are actually supposed to do, they are unable to keep track of the time they spend doing such activities. This leads to a deep neglect of their studies and derails their routine schedules. Smartphone addiction in teens and adolescents gives rise to anxiety, stress and insomnia leading to maladjustments and maladaptation to the environment.

Deprivation of Sleep:

Most teenagers and adolescents nowadays use smartphones and/or tablets, which they carry with them wherever they go, even to bed. They also use these devices to hook on to the internet before going to sleep to catch up on what's happening around them. Well- adjusted teenagers and adolescents may log off after a while, however, those addicted to the internet continue to browse for long hours. As a result, they suffer sleep-related issues like late sleep time, insufficient or restless sleep, and late waking time. This sleep deprivation / disturbance leads to insomnia which worsens or magnifies symptoms of anxiety and depression.

Inability to socialise:

Those who spend a lot of time on the internet tend to become a part of one or several online communities. They end up developing close friendships or intimate relationships with a lot of undesirable and wrong individuals. To remain connected with these individuals, internet addicts stay online for long hours and often end up feeling disconnected from their families and peers which adversely affects close family relationships and bonds, leading to broken families and broken homes.

Dishonesty and lying:

Almost all internet addicts understand that they have a problem. However, when confronted or questioned by family members or friends, they try to conceal their habit by either lying or being dishonest about the time they spend on the internet.

Swings in Mood:

Internet addicts use the internet to minimize their stress and elevate their mood. They feel happy or euphoric by being hooked to the internet without any commitment, responsibility and accountability. Indiscriminate utilisation of the internet also negatively impacts society and the family as under:

1) Less interaction with the family leads to the breakdown of family relationships and close relationships.
2) Limited time spent in bonding with real- world friends leads to a breakdown in social relationships.
3) Exposure to false information and negative propaganda mislead children and make them easy victims of indoctrination.
4) Being agonized mentally due to cyber-bullying and online-stalking behavior contributes to various mental health issues.

5) The heightened risk of falling victim to online scams and phishing attacks often causes financial losses.

The proliferation of the Internet as well as smartphone addiction, has led to serious consequences in work-life balance which has disrupted normal functioning, The dysfunctional issues is a matter of grave concern which leads to maladaptation and maladjustment in society leading to unacceptable behaviour and actions in internet and smartphone addicts. Internet / smartphone addiction has proved to be a bane for social relationships and social cohesion. This has also threatened the family and societal fabric which are the building blocks of human existence.

The internet has received much negative news coverage in recent years, which highlights on major privacy scandals and security breaches, the proliferation of fake news, rampant harmful behaviors like cyber- bullying, host of cyber crimes, scam, revenge porn, the exchange of child porn and internet predation, internet addiction, and the negative effects of the internet on social relations and social cohesion.

4. Detrimental Socio- Cultural Impact Associated with the Internet

Several studies have pointed to a number of different harmful social and cultural effects associated with internet use. The evidence points to the occurrence of significant damage to both individuals and society. Some of these harmful effects are as under:

4.1. Overload of Information

Information overload is associated with loss of control, feelings of being overwhelmed, reduced intellectual performance, and diminished job satisfaction. Studies show that information overload affects up to 20-30% of people.

4.2. Harm to Social Ties and Social Relationships

Extensive internet use, of social media in particular, is correlated with loneliness and social isolation. Intimate relationships can be degraded by internet use, particularly due to viewing online pornography. Malicious online behaviour, particularly cyber-bullying, cyber-stalking and online predation, affects a significant percentage of internet users.

4.3. Blurring and Lack of Distinction Between Public / Private Boundaries

The way in which the internet and smartphones blur the distinction between private and public, and between different spheres of life, including work, home life and leisure, harms the boundaries between people's public and private lives. Harmful effects that can result from such permeation include loss of quality of life, lack of privacy, decreased safety and security, and harm to societal / family relationships- whereby friends and family members feel they are left behind by the new technology.

4.4. Adverse Effects on Cognitive Development in Children

Empirical evidence has highlighted that internet use can have both positive and negative impacts on cognitive development in children. There is evidence that children's cognitive development can be damaged by prolonged internet use, including the development of memory skills, attention span, abilities for critical reasoning, language acquisition, reading, writing skills and learning abilities. More research is however needed to draw more reliable conclusions.

4.5. Adverse Impact on Communities

Many off- line communities suffer through the partial migration of human activities such as shopping, e-commerce, socialising, leisure activities, professional interactions which are now possible due to the internet. Online communities sometimes extend off–line communities and sometimes replace them. They are often inadequate replacements as they do not possess some of the valuable or the strongest qualities of off-line communities, and communities may consequently suffer from impoverished communication, incivility, and a lack of trust and commitment.

5. Undesirable Effects of Smartphone Addiction

Various researches have highlighted that internet gaming addiction leads to several cognitive and emotional deficits specially among children, teenagers and adolescents who tend to indulge in online games to cope with their emotional distress. Indulging in online games excessively for a prolonged period of time may separate these on-line addicts from real-life situations and relationships which can cause severe mental health issues such as anxiety, depression, etc.

5.1. Mobile Game Addiction vis-à-vis Anxiety, Depression and Loneliness

Various researches have highlighted that there exists a strong correlation between loneliness and online game addiction. In addition, loneliness was found to be one of the potent causes as well as the consequence of online gaming addiction thus sharing a possible symbiotic and reciprocal relationship. There can be no two opinions on the matter that loneliness can never substitute real-life interactions as far as interpersonal relationships are concerned. By indulging in on-line game addiction, loneliness further gets exacerbated leading to maladjustments and maladaptation in social and family situations which leads to further feelings of loneliness and anxiety.

5.2. Fading and Diminishing of Various Virtuous Traits Due to Smartphone Addiction

Due to technological advances. there is an increasing desire and even demand for the instant and the immediate by people. Once a virtue, patience is becoming as rare as handwritten letters. Google found that slowing search results by just 0.4 seconds would reduce the number of searches by eight million per day. One in four people abandon a web page that takes more than four seconds to load. Half of smartphone users abandon a page if it does not load in 10 seconds [22]. "The short attention span resulting from the quick interactions is detrimental to focussing on the harder problems as millennials benefit and suffer due to their hyperconnected lives" [4]. It has been found that students who remained constantly connected to the internet and smartphone thirst for instant gratification which leads them to make quick, shallow choices [4]. Brainstorming has been considered to be the panacea for problem solving on various issues. However, due to smartphone addiction, discussion and analysis of the problems have been diluted to a significant degree as there is little or no conversations on the problems at hand, as technology provides the necessary information. There is a lack of deep thinking, contemplation and reflection which are getting lost sight of and overlooked in today's instantaneous culture. There is a fading and diminishing of various virtuous traits due to smartphone addiction. It transpires from the above, that a great amount of holistic thinking and actions that are needed by various stakeholders to ameliorate the adverse effects of smartphone addiction.

6. Maladaptation and Maladjustment Due to Smartphone Addiction

In the troublesome and turbulent teenage years, teenagers and adolescents are more prone to experience social anxiety and find social situations discomforting. Due to smartphone addiction, one-third of adolescents and teenagers more often than not, experience social anxiety as they are unable to connect and establish sound social relationships or engage in social interactions effectively. Various studies have highlighted that the quality of interpersonal relationships was undermined among children, teenagers and adolescents spending more time playing online games alongwith an increase in the amount of social anxiety.

6.1. Anxiety Due to the Inability to Maintain Effective Social Relationships

There exists a reciprocal connection between smartphone addiction and mental health problems. Various studies have analysed the correlation between smartphone addiction, with depression, social anxiety, and loneliness. Smartphone addiction can be a way to evade problems such as: low self-esteem, guilt, insecurity, boredom, stress and anxiety by compensating or forgetting about it with the dopamine squirt [61]. Smartphone users through the applications of e-mail, text messages, Facebook, Twitter, Instagram and other social media as well as the internet are more prone to be addicted than non-addicted users [73]. It is the contents of the internet which leads to its excessive use [7, 63]. Smartphone

addiction have been linked to personality traits such as impulsiveness, neurosis, extroversion, distortion in self-esteem, self-image as well as identity [19]. Additionally, it is associated to stress, anxiety, depression, sleep disorders as well as the use of alcohol and cigarettes. It was seen that single adults showed more addiction to smartphones than those who were married [69].

6.2. Dopamine Squirt Due to Smartphone Addiction vis-à-vis the Downturns Associated with It

There is an undeniable truth that addiction to smartphone in individuals is akin to drug addiction in terms of the habit, severity and the consequences which follows an addiction. Just as drug addicts are addicted to the drug, via the needle being just a delivery method, similarly, smartphone addicts are hooked to the plethora of information, entertainment and personal connections delivered by the smartphone. The Dopamine Squirt due to Smartphone addiction has several downturns which run parallel to smartphone addiction in terms of the effects, impacts and consequences and is therefore, a cause of concern globally. Individuals can go to great lengths to connect with others disregarding the time wasted, the purpose it serves and the necessity for it, often missing out the moot point and other significant issues that is required to be attended to by them, which may be of greater importance and salience. The emergence of Facebook, Messenger, text messaging, Instagram, Twitter and many other social networks are testimony to this characteristic of human nature. Smartphones provide a portable, instant way to stay informed, entertained and connected. The *agenda-setting* theory states that, whatever mass media choose to report and emphasize, they create public awareness of, and concern for salient issues. Smartphones are instrumental in *agenda-fulfilling* whereby individuals now decide what types of news and entertainment they access and from what sources. Customization feeds the motivation to frequently interact with the smartphone, being the primary delivery method for the customized content.

In his classic work, Understanding Media [47] has probed the ways in which new form of media change the perception of societies with particular emphasis on the effects of each medium in contrast to the content that is transmitted by each medium. It has been observed that any medium "amplifies and accelerates existing processes", by introducing a "change of scale or pace or shape or pattern into human association, affairs and action", which results in "psychic and social consequences" [47]. This implies that the nature and characteristics of anything that is conceived or created by the medium by means of the subtle and unnoticed changes effected through it, becomes the message [24]. Smartphone offers the medium through which there is an insatiable urge to remain connected-with news, information, entertainment and other people. Connection is about stimulation which is provided in abundance by the smartphone. Although a plethora of services and features inherent in the smartphone provide the necessary food for stimulation, however, it is neither immune nor insulated from the less obvious effects as

well as various adverse impacts on issues such as self-alienation, anxiety, impatience, mood swings, insomnia, disruption in work schedules as well as disturbances, imbalances and disruption in family life etc.

The emerging swift and precipitating changes in the digital environment have brought about new communication processes in contemporary society. This is particularly true in adolescents, who are increasingly involved in new technologies to communicate with each other. A survey on 792 university students showed that there was an increase in the problematic use of the internet and smartphones as well as music applications [15]. The study pointed out a difference between mobile phones from the period 2006 to 2016. In a research study conducted in Australia, it was discovered that anxiety is one of the traits related to smartphone use, which is also linked to unsafe behaviours, such as driving a vehicle while using mobile phones/ smartphones, something that can lead to severe accidents [54]. Another finding was that women between the ages of 18 and 25 years old used mobile phones /smartphones more frequently.

Public places such as restaurants, banks and post offices are among the first to display "no cell phone" signs. Following their footsteps, other places such as airports and railway stations have also created "quiet zones". Several researches have consistently shown that individuals are attached and habituated to checking their smartphone at an average of 80 times per day. Smartphone addicts tend to hear and feel phantom smartphone sounds and vibrations even when their smartphones are not in use. Smartphones have invaded almost every aspect of the lives of individuals. Even elevators and bathrooms are not immune from phone conversations. A study was undertaken to examine the use of smartphones from the shower to the sack. Nearly one in ten have admitted to using their phone during sex! [11]. Two-thirds of the respondents reported to have the fear of being abandoned and left in the lurch without their smartphone or feel they are missing something without it. Almost 94% of the respondents reported feeling panicked, desperate or sick upon discovering that they have misplaced their smartphone [5]. Thus, smartphones have become an extension of the individuals and many feel helplessly addicted to it. The Internet and Tech Addiction Anonymous website is patterned after 12 steps of Alcoholics Anonymous (https://www.netaddiction.org/about/itaa-12-steps/) for smartphone addicts to become de-addicted.

The *Diagnostic and Statistical Manual of Mental Disorders (5th ed.)* which is the American Psychiatric Association's (APA) classification and diagnostic tool has listed Internet Addiction Disorder (IAD) as a common problematic internet use or compulsive internet use disorder [13]. As smartphones have easy internet access, addictive and habitual behaviours which are attached to internet use are also associated with the use of smartphone. A high level of tolerance behaviour for the addictive stimuli is one of the key characteristics of any addiction. Due to the addictive properties and features of a smartphone, the smartphone addicts are unable to lessen the severity and incessant use of

smartphone which leads to various adverse impacts in their personal, social, emotional, psychological as well as work life balance. There are many individuals who experience an enormous increase in personal and psychological stress that are caused by the excessive use of smartphone. Smartphone addicts are more prone to suffer from severe anxiety and stress by being disconnected with the outside environment which leads to various kinds of maladaptation and maladjustments.

A seminal contribution has been made by the author of *The Disowned Self* who has opined that, though students are increasingly connected to the world through various technological devices including the smartphone, yet they remain alarmingly disconnected from themselves and disassociated with significant others. The Pew Research Center's *Internet and American Life Project* [57] has given a finding that smartphone ownership and internet usage continues to climb in emerging economies. According to this study, "the average size of Americans' core discussion networks has declined... by about one-third" and that "the diversity of core discussion networks has markedly declined leading to Social Isolation" [66]. In her TED talk, "Connected but alone," psychologist [76] has stated that "technology helps us feel connected in ways we can control; it provides the illusion of companionship without the demands of friendship". Though people are increasingly connected, yet they remain increasingly lonely [76]. In her book *Alone Together* [75] has discussed about the paradox being "technology promises to let us do anything from anywhere with anyone. But it also drains us as we try to do everything, everywhere. We turn to new technology to fill the void. But as technology ramps up, our emotional lives ramp down. As we distribute ourselves, we may abandon ourselves."

It has been opined by [75] that digital devices offer three gratifying fantasies: "we can put out attention wherever we want it to be, we will always be heard, and we will never have to be alone". There is an aggressive, almost fearful, avoidance of solitude by human beings, and technology is a willing accomplice by providing a mirage of filling the void. However, the companionship offered by technological devices is only an illusion which is a predator of familial ties, authentic relationships, social interaction and soul searching which is often lost sight of. People are driving at break-neck speed, connected to the world via GPS technology, but disconnected from our own sense of direction and purpose. People talk, tweet and text as cyborgs to avoid quiet confrontations with our own unexplored thoughts [16].

Smartphones are universally pervasive and permeating in today's culture. The adverse effects of smartphone addiction on the physical, emotional, psychological, sociological as well as on the cognitive, behavioural and attitudinal aspects of human functioning is still largely unknown. According to General Manager of Fool.com, "what has been really underestimated is not only the growth of smartphones but also the number of lives changed forever". The pervasive and convenience of using smartphones for internet access have

induced not only several advantages but also innumerable disadvantages including addiction dependence [9, 17], various financial problems [9], dangerous use (whilst driving) [8] and prohibited use (in forbidden areas) [51]. The prevalence rate and estimates of smartphone addiction from an epidemiological perspective varies considerably across cultures and there is limited knowledge and understanding about the aetiology of problematic and addictive smartphone use, including its course. Nevertheless, the World Health Organisation [81] has considered addictive smartphone use as a public health concern, emphasising the need for more concerted research with reference to the risk factors and course corrections needed. Addictive use of the smartphone induces habitual checking behaviours, which may contribute to developing psychopathological symptoms [33]. In the recent edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) (American Psychiatric Association) [3], *Internet Gaming Disorder* has been included as a behavioural addiction. However, smartphone addiction may be included in the above manual if it leads to clinically significant impairment [38, 39].

Using a biopsychosocial model of addiction, smartphone addiction may be considered to fall within the ambit of behavioural addictions, including symptoms such as withdrawal, mood modification, salience, tolerance, conflict and relapse [29] as it poses a significant (mental) health concern for the affected individual. Young adults specifically appear to be more enthusiastic adopters of mobile technologies and research has consistently shown that teenagers and young adults are a high risk group for developing smartphone addiction [33, 42].

Various researches have highlighted that smartphone addiction was related to anxiety, depression and general distress [30, 32, 55]. Individuals suffering from social anxiety show a predominant preference for using smartphone for asynchronous communication which are text-based as this may alleviate the fears associated with face-to-face and synchronous interactions potentially contributing to problematic use [56]. Smartphone addiction was also correlated with depression among university students in Iran [6]. Individuals who feel depressed may use smartphones to seek social support and to cope with their loneliness, feelings of anxiety and apathy, which may exacerbate feelings of depression and stress [50]. Various kinds of stress and stressors are among a few factors leading to smartphone addiction [33]. Generation Y are very keen and enthusiastic adopters of new technology especially the smartphone which is used by them for a host of activities including coping with various kinds of everyday stressors (social situations and relationship problems). However, excessive usage of the smartphone as a coping mechanism can be considered dysfunctional which is similar to excessive usage of the Internet to cope with life's problems [40] potentially leading to symptoms traditionally associated with substance-related addictions [35, 40]. Research has highlighted that children, teenagers and adolescents are at a potentially greater risk for smartphone addiction [46].

Females by nature tend to consider social interactions to be of more importance than males which makes them susceptible to certain kinds of risks associated with smartphone addiction. Similarly, individuals engaged in excessive usage of smartphone including smartphone-related activities such as sending text messages and making calls become prone to habitualisation effects, including frequent checking [34], which increases the consequential effects of the problems associated with smartphone addiction.

Several researches have highlighted that depression and anxiety can be a significant contributor and a predictor for problematic smartphone use. A noteworthy difference was shown in the case of Generation Y who may be more anxious than Generation X (with a few exceptions) which is possibly due to Generation Y experiencing a fear of missing out (FOMO) [59], leading to a heightened need and requirement to become addicted to the smartphone. From a developmental perspective, in the growing-up years whilst in the process of psychosocial maturation, younger individuals may be confronted with more anxiety, which eventually evens out as they become older and more mature [49]. Similar trends may hold true for depression-related symptoms and mental health issues connected to smartphone addiction [6, 50].

7. Suggestions for Future Research

Future research needs to assess the interaction effects between specific smartphone uses with both depressive and anxiety symptoms especially among teenagers and adolescents. Young individuals appear particularly keen to connect with each other using technology whilst simultaneously being alone in their physical environments, effectively leading to them being "alone together" [76]. Studied from a psychological perspective, Generation Y tend to rely on asynchronous social media-based communication which may lead to a decrease in fear associated with participating in "real life" social interactions, but may increase the likelihood of problems if used in excess [56]. Engagement in activities other than moderate use of social media, namely gaming and browsing, did not significantly predict problematic smartphone use [46]. It can be hypothesised that this may have resulted from a majority of female participants in this study, and previous research has shown the number of female gamers is still relatively low as compared to males [39], and females are significantly less likely to experience gaming related problems [39, 41]. Future research may investigate the longitudinal as well as gender differences with reference to smartphone addiction.

The above findings have implications for prevention and awareness-raising efforts of possibly problematic smartphone use for educators, parents and individuals themselves, particularly dependence and prohibited use of smartphone. Specifically, dedicated interventions are the need of the hour to encourage and foster coping skills in smartphone heavy users so as to decrease dysfunctional coping patterns associated with smartphone addiction.

Similar to the treatment of Internet addiction, clinical interventions and counselling needs to be developed which can prove to be of immense benefit so as to pay particular attention to the individual's usage habits and maladaptive coping behaviours and take into consideration different modes of communication (synchronous vs asynchronous) as these have shown to differ across age groups. Future research efforts are encouraged to assess smartphone usage differences across various age groups as well as gender so as to examine as to how these may impact differently, on resultant problems using longitudinal, experience-sharing and qualitative research.

8. Discussion and Conclusion

Among young adults, there exists a positive correlation between smartphone gaming addiction with depression, loneliness and social anxiety. Furthermore, there exists gender differences between smartphone gaming addiction and social anxiety, with male adolescents showing a greater propensity towards smartphone gaming addiction and social anxiety. It has been highlighted by various researches that video game addicts reported more anxiety, depression, lower positive affect and psychological well-being. Further, several research studies have also shown that Internet addicts have poor emotional health, particularly depression and anxiety and there existed a statistical significant correlation between the degree of internet addiction with loneliness and depression [79].

An increase in psychopathology was noted among adolescents with excessive Internet use, as per the Brief Symptoms Inventory (BSI) which is a relatively brief self-report psychometric instrument of the Symptoms Checklist, (SCL-90) compared with those low in internet use. The association between smartphone gaming addiction and mental health may be due to social isolation and social anxiety resulting from excessive indulgence in online games by the teenagers, adolescents and young adults which undermines psychological well-being and mental health which is a cause for concern globally, as it induces various kinds of maladaptation and maladjustments to the environment.

The maladjustments and maladaptation due to smartphone addiction has overarching ramifications both horizontally and vertically, as it leads to several adverse impacts on the physical, psychological, sociological, emotional, behavioural, attitudinal as well as the mental health of the smartphone addicts. The harmful impact of smartphone addiction on the cognitive, behavioural and attitudinal aspects of human functioning cannot be underestimated. Smartphone addiction shows a disequilibrium towards maladaptation and maladjustments whereby the minuses have outgrown the pluses of smartphone usage. The negative mental health outcomes are pervasive and permeates different aspects of human functioning which needs to be dealt with in a holistic manner by the various stakeholders so that the adverse impacts of smartphone addiction are reduced to a significant degree in order to foster effective adaptation to the environment.

Disclaimer

The observations, views and opinions are for academic purposes only which have been given by the Author in her personal capacity and not in her official capacity.

References

[1] Abo-Jedi, A. (2008). Smartphone addiction and its relation to self-closure in a sample of Jordanian university and Amman private university students. The Jordanian Journal for Educational Sciences 4: 137-150. [Google Scholar].

[2] Alasdair, A., Philips, J. (2017). Digital Enhanced Cordless Telecommunication or DECT phones. Available at: http://www.powerwatch.or.uk, pp. 1-12.

[3] American Psychiatric Association (APA) (2013). Diagnostic and Statistical Manual of Mental Disorders (5th edn). Washington, DC: APA. [Google Scholar].

[4] Anderson, J. Q., & Rainie, L. (2012). Mellennials will benefit and suffer due to their hyperconnected lives. Pew Research Center's Internet and American Life Project. Retrieved from https://www.pewinternet.org/topics/Future-of-the-internet.aspx.

[5] Archer, D. (2013). Reading between the (head)lines; Smartphone addiction. Psychology Today. Retrieved from http://www.psychologytoday.com/blog/reading-between-the-headlines/201307/smartphone-addiction.

[6] Babadi-Akashe, Z., Zamani, B. E., Abedini, Y., Akbari, H., & Hedayati, N. (2014). The relationship between mental health and addiction to mobile phones among university students of Shahrekord, Iran. Addiction & Health, (63-4), 93-99.

[7] Beranuy, M., Chamarro, A., Graner, C., & Carbonell, X. (2009). Validación de dos escalas breves para evaluar la adicción a Internet y el abuso de móvil [Validation of two short scales to assess Internet addiction and mobile abuse]. Psicothema, 21, 480-485.

[8] Bianchi, A., & Phillips, J. (2005). Psychological predictors of problem mobile phone use. CyberPsychology and Behavior 8 (1): 39-51. [PubMed] [Google Scholar].

[9] Billieux, J., Van der Linden, M., & Rochat, L. (2008). The role of impulsivity in actual and problematic use of the mobile phone. Applied Cognitive Psychology, 22, 1195-1210.

[10] Bragazzai, N. L., Del Puente, G. (2014). A proposal for including nomophobia in the new DSM-V, Psychol Res BehavManag. 7: 155–160.

[11] Brown, E. (2013). Phone sex: Using our smartphones from the shower to the sack. ZD Net Social Business. Retrieved from http://www.zdnet.com/phone-sex-using-our-smartphones-from-the-shower-to-the-sack-7000017935.

[12] Brunborg et al. (2011). The relationship between media use in the bedroom, sleep habits and symptoms of insomnia, Journal of Sleep Research.

[13] Byun, S., Ruffini, C., Mills, J. E., Douglas, A. C. Niang, M., Stepchenkova, S., Lee, S. K., Loutfi, J., Lee, J-K., Atallah, M., & Blanton, M. (2009). Internet Addiction: Metasynthesis of 1996-2006 quantitative research. Cyberpsychology & Behaviour 12 (2), 203-207.

[14] Cagan, O., Unsal, A. and Celik, N. (2014). Evaluation of College Students' the Level of Addiction to Cellular Phone and Investigation on the Relationship between the Addiction and the Level of Depression. Procedia—Social and Behavioral Sciences, 114, 831-839.

[15] Carbonell, X., Chamarro, A., Oberst, U., Rodrigo, B., & Prades, M. (2018). Problematic use of the internet and smartphones in university students: 2006-2017. Int. J. Environ. Res. Public Health, 15 (475), 1-13.

[16] Case, A. (2011). We are all cyborgs now. Ted Women. Retrieved from https://www.ted.com/talks/amber_case_we_are_all_cyborgs_now.html.

[17] Choliz, M. (2010). Mobile phone addiction: a point of issue. Addiction, 105, 373-374.

[18] Cougle, J. R., Fitch, K. E., Fincham, F. D., et al. (2012). Excessive reassurance seeking and anxiety pathology: Tests of incremental associations and directionality. Journal of Anxiety Disorders 26: 117-125. [PubMed] [Google Scholar].

[19] De-Sola, J., Rodriguez, F., & Rubio, G. (2016). Cell-Phone Addiction: A Review. Frontiers in Psychiatry, 175 (7), 1-15.

[20] Diener, E., Emmons, R, A., Larsen, R. J., et al. (1985). The satisfaction with life scale. Journal of Personality Assessment 49 (1): 71-75. [PubMed] [Google Scholar].

[21] Divan, H., Khelfets, L., Obel, C., & Olsen, J (2010). Cell phone use and behavioural problems in young children. Journal of Epidemiology & Community Health, 66 (6), 524-539.

[22] Dunlop, D. (2012, March 19). Is the instant gratification of the Internet making Americans impatient? The Healthcare Marketer. Retrieved from http://thehealthcaremarketer.wordpress.com/2012/03/19/is-the-instant-gratification-of-the-internet-making americans-impatient/ Emanuel, R. (2013, March). The American college student cell phone survey. College Student Journal, 47 (1), 75-81.

[23] Evraire, L. E., Dozois, D. J. (2011). An integrative model of excessive reassurance seeking and negative feedback seeking in the development and maintenance of depression. Clinical Psychology Review, 31 (8): 1291-1303. [PubMed] [Google Scholar].

[24] Federman, M. (2004). What is the Meaning of the Medium is the Message? Retrieved from http://individual.utoronto.ca/markfederman/article_mediumisthemessage.html

[25] Global mobile statistics 2011: All quality mobile marketing research, mobile Web stats.

[26] Goldberg, I. (1996). Internet addiction: Electronic message posted to research discussion list. Available at: http://www.cmhic.com/mlists/research

[27] Grant, J., Potenza, M., Weinstein, A., et al. (2010). Introduction to behavioral addictions. The American Journal of Drug and Alcohol Abuse, 36: 233-241. [PMC free article] [PubMed] [Google Scholar].

[28] Greenfield, D. N. (1999). Virtual Addiction. Oakland, CA: New Harbinger Publications. [Google Scholar].

[29] Griffiths, M. D. (2005). A "components" model of addiction within a biopsychosocial framework Journal of Substance Use 10: 191-197. [Google Scholar].

[30] Ha, J. H., Chin, B., Park, D. H., Ryu, S. H., & Yu, J. (2008). Characteristics of excessive cellular phone use in Korean adolescents. Cyberpsychology & Behavior, 11 (6), 783-784.

[31] Heron, D., Shapira, N. A. (2004). Time to log off: New diagnostic criteria for problematic internet use. Current Psychiatry 2 (4): 21-29 [Google Scholar].

[32] Hong, F. Y., Chiu, S. I., & Huang, D. H. (2012). A model of the relationship between psychological characteristics, mobile phone addiction and use of mobile phones by Taiwanese university female students. Computers in Human Behavior, 28 (6), 2152-2159.

[33] Jeong, S.-H., Kim, H., Yum, J.-Y., & Hwang, Y. (2016). What type of content are smartphone users addicted to? SMS vs. games. Computers in Human Behavior, 54, 10-17.

[34] Kanjo, E., Kuss, D. J., and Ang, C. S. (2017). NotiMind: responses to smartphone notifications as affective sensors. IEEE Access, in press.

[35] Kardefelt-Winther, D. (2014). A conceptual and methodological critique of internet addiction research: towards a model of compensatory internet use. Computers in Human Behaviour, 31, 351-354.

[36] Kim, J., Seo, M., David, P. (2015). Alleviating depression only to become problematic mobile phone users: Can face-to-face communication be the antidote? Computers in Human Behavior 51: 440-447. [Google Scholar].

[37] Kraut, R. Patterson, M. Lundmark V, et al. (1998). Internet paradox: A social technology that reduces social involvement and psychological well- being? American Psychologist, 53: 1011-1031. [PubMed] [Google Scholar].

[38] Kuss, D. J., & Griffiths, M. D. (2012). Internet gaming addiction: a systematic review of empirical research. International Journal of Mental Health and Addiction, 10 (2), 278-296.

[39] Kuss, D. J., & Griffiths, M. D. (2015). Internet addiction in psychotherapy. London: Palgrave.

[40] Kuss, D. J., and Griffiths, M. D. (2017). Social networking sites and addiction: ten lessons learned. International Journal of Environmental Research and Public Health, in press.

[41] Kuss, D. J., Griffiths, M. D., & Pontes, H. M. (2014). Chaos and confusion in DSM-5 diagnosis of Internet Gaming Disorder: Issues, concerns, and recommendations for clarity in the field. Journal of Behavioral Addictions, 7, 1-7.

[42] Kwon, M., Kim, D.-J., Cho, H., & Yang, S. (2013). The Smartphone Addiction Scale: Development and validation of a short version for adolescents. PLoS One, 8 (12).

[43] Lemish, D., Cohen, A. A. (2005). On the gendered nature of mobile phone culture in Israel. Sex Roles 52: 511-521. [Google Scholar].

[44] Lemola, S., Perkinson-Gloor, N., Brand, S. et al. (2015). Adolescents' electronic media use at night, sleep disturbance, and depressive symptoms in the smartphone age. Journal of Youth and Adolescence 44: 405-418. [PubMed] [Google Scholar].

[45] Lepp, A., Li, J., Barkley, J. E., Salehi-Esfahani, S. (2015). Exploring the relationships between college student's smartphone use, personality and leisure. Comput. Hum. Behav. 43: 210-219 [CrossRef] [Google Scholar].

[46] Lopez-Fernandez, O., Kuss, D. J., Romo, L., Morvan, Y., Kern, L., Graziani, P., Billieux, J. (2017). Use and misuse of mobile technologies in young adulthood: a European cross-cultural empirical study. Journal of Behavioral Addictions, in press.

[47] McLuhan, M. (1964). Understanding Media: The Extensions of Man. New York: McGraw-Hill.

[48] Morhan-Martin, J. (1999). The relationship between loneliness and Internet use and abuse. CyberPsychology and Behavior 2: 431-440. [PubMed] [Google Scholar].

[49] Motti-Stefanidi, F. (2015). Identity development in the context of the risk and resilience framework. In K. C. McLean & M. Syed (Eds.), The Oxford handbook of identity development (pp. 472- 489). Oxford: Oxford University Press.

[50] Murdock, K. K. (2013). Texting while stressed: Implications for students' burnout, sleep, and well-being. Psychology of popular Media Culture, 24 (4), 207-221.

[51] Nickerson, R. C., Isaac, H., Mak, B. (2008). A Multi-national study of attitudes about mobile phone use in social settings. International Journal of Mobile Communication, 6 (5), 541-563.

[52] Nie & Erbring, L. (2000). Debating the societal effects of the internet: Reconciling conflicting findings. American Behavioral Scientist, 45: 420-435. [Google Scholar].

[53] Oulasvirta, Rattenbury T, Ma, L, et al. (2012). Habits make smartphone use more pervasive. Personal and Ubiquitous Computing 161 (1): 105-114. [Google Scholar].

[54] Oviedo- Trespalacios, O., Nandavar, S., Newton, J., Demant, D., & Phillips, J. (2019). Problematic use of mobile phones in Australia. Is it going worse: Frontiers in Psychiatry, 10 (105), 1-18.

[55] Panova, T., & Lleras, A. (2016). Avoidance boredom: negative mental health outcomes associated with use information communication technologies depend on users' motivations. Computers in Human Behavior, 58, 249- 258.

[56] Park, N., Hwang, Y., and Huh, E. (2010). Exploring Problematic mobile phone use: relationships between adolescents' characteristics and mobile phone addiction. Paper presented at the Annual meeting of the International Communication Association, Suntec City, Singapore.

[57] Pew Research Center. (2016). Smartphone ownership and internet usage continues to climb in emerging economies. Available at: - http://www.pewglobal.org//2016/02/22/smartphone-ownership- and- internet usage continues-to-climb-in-emerging-economics climb in emerging economics/ Phones.aspx Project. Pew Research Center. Retrieved from http://pewinternet.org/Reports/2011/Cell

[58] Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. Computers in Human Behavior, 29, 1841–1848.

[59] Przybylski, A., Weinstein. (2013). Can you connect with me now? How the presence of mobile communication technology influences face-to-face conversation quality. Journal of Social and Personal Relationship. 30 (3).

[60] Rees, H., Noyes, J. M. (2007). Mobile telephones, computers, and the internet: Sex differences in adolescents' use and attitudes. CyberPsychology and Behavior 10: 482-484. [PubMed] [Google Scholar].

[61] Roberts, J. A., Yaya, LHP, Manolis, C. (2014). The invisible addiction: Cell-phone activities and addiction among male and female college students. Journal of Behavioral Addictions, 3 (4): 254-265. [PMC free article] [PubMed] [Google Scholar].

[62] Samaha, M., Hawi, N. S. (2016). Relationships among smartphone addiction stress, academic performance, and satisfaction with life. Computers in Human Behavior 57: 321-325. [Google Scholar].

[63] Sánchez-Carbonell, X., Beranuy, M., Castellana, M. Chamarro, A., & Oberst, U. (2008). La adicdióna Internet y al móvil, ¿moda o trastorno? Adicciones, 20 (2), 149-160.

[64] Scheufeli, D. A. & Shah, D. V. (2000). Personality strength and social capital: The role of dispositional and informational variables in the production of civic participation. Communication Research, 27: 107-131. [Google Scholar].

[65] Schumpeter, (2011). Too much information: How to cope with data overload. The Economist.

[66] Social Isolation and New Technology: How the Internet and Mobile Phones Impact Americans' Social Networks (2009, November 4). Pew Research Center Publications. Retrieved from http://pewresearch.org/pubs/1398/internet-mobile-phones-impact-american-social networks.

[67] Statista, (2017). Number of smartphone users worldwide from 2014 to 2020. Available at: https://www.starista.com/statistic/330695/number-of smartphone-users-worldwide/

[68] Strategus. (2018). Nomophobia: The irrational fear of being without your mobile phone.

[69] Sung, W. (2016). A study on the internet addiction in the smart era. Advanced Science and Technology Letters, 127, 102-107.

[70] The Symptom Checklist-90-R (SCL-90-R) is a relatively brief self-report psychometric instrument (questionnaire) published by the Clinical Assessment division of the Pearson Assessment & Information group. It is designed to evaluate a broad range of psychological problems and symptoms of psychopathology. It is also used in measuring the progress and outcome of psychiatric and psychological treatments or for research purposes.

[71] Thomee, S., Härenstam, A., Hagberg, M. (2011). Mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults: A prospective cohort study. BMC Public Health 11: 66. [PMC Free article] [PubMed] [Google Scholar].

[72] Torrecillas, L. (2007). Mobile Phone addiction in teenagers may cause severe psychological disorder. Medical Studies, 14: 11-13. [Google Scholar].

[73] Tosell, C., Kortum, P., Shepard, C., Rahmati, A., & Zhong, L. (2015). Exploring smartphone addiction: insights from long-term telemetric behavioral measures. Int. J. Interact Mob Technol, 9, 37-43.

[74] Tsitsika, A., Critsells, E., Kormas, G., et al. (2009). Adolescent pornographic internet site use: A multivariate regression analysis of the predictive factors of use and psychosocial implications. CyberPsychology and Behavior, 12: 545-550. [PubMed] [Google Scholar].

[75] Turkle, S. (2011). Alone together. Why we expect more from technology and less from each other. Philadelphia: Basic Books.

[76] Turkle, S. (2013). Connected, but alone? TED Talk. Retrieved from http://www.ted.com/talks/lang/en/sherry_turkle_alone_togethe r.html

[77] Vollmer, C., Michel, U., Randler, C. (2012). Outdoor light at night (LAN) is correlated with eveningness in adolescents. Chronobiology International, 29: 502-508. [PubMed] [Google Scholor].

[78] Wajcman, J., Bittman, M., Jones, P. et al. (2007). The Impact of the Mobile Phone on Work/Life Balance. Canberra: Australian National University. [Google Scholar].

[79] Wang et al. (2018). Social networking sites addiction and adolescent Depression: A moderated mediation model of rumination and self-esteem Personality and Individual Differences.

[80] Wolniczak, I., Cáceres-DelAguila, J. A., Palma-Ardiles, G., et al. (2013). Association between Facebook dependence and poor sleep quality: A study in a sample of undergraduate students in Peru. PLos One, 8 (3): e59087. [PMC free article] [PubMed] [Google Scholar].

[81] World Health Organization [WHO]. (2015). Public health implications of excessive use of the internet, computers, smartphones and similar electronic devices. Meeting report, Main Meeting Hall, Foundation for Promotion Cancer Research, National Cancer Research Centre, Tokyo, Japan, 27-29 August 2014. Geneva, Switzerland. World Health Organization.

[82] Ybarra, M., Mitchell, K. J. (2005). Exposure to internet pornography among children and adolescents: A national survey. CyberPsychology and Behavior, 8: 473-486. [PubMed] [Google Scholar].

[83] Young, K. S. (1999). Internet addiction Symptoms, evaluation, and treatment. In: Vandecreek, L., Knapp, S., Jackson, T. L. (eds) Innovations in Clinical Practice: A Sourcebook Sarasota, FL: Professional Resource Press, pp. 1-13. [Google Scholar].