

**Problematic smartphone usage and motivation among
Sultan Qaboos University Undergraduates :
A Mixed- Methods Study**

*Problématique de l'usage du smartphone et motivations des
étudiants de premier cycle à l'Université du Sultan Qaboos :
méthodes mixtes*

إشكالية استخدام الهاتف الذكي والحوافز لدى طلبة المرحلة الأولى بجامعة
السلطان قابوس : منهجية مزدوجة

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Abstract : This study investigated Smartphone usage, gratifications, and addiction among SQU undergraduates, adopting the uses and gratifications theory (UGT) as a framework. Two questionnaires on Smartphone usage, gratifications, and addiction had been applied to a stratified sample comprising (849) undergraduates at SQU (48.8% male, 51.2% female). In addition, four discussion sessions with two focus groups were conducted using a sample of (16) students. The quantitative findings indicated that WhatsApp/text message services were the heaviest Smartphone applications usage. Seeking information and entertainment were the most common Smartphone gratifications among SQU undergraduates. The prevalent rate of Smartphone addiction was 33.1%, while disregard of harmful consequences was the most frequent addiction symptom among those students. The qualitative findings not only highlighted the reasons behind Smartphone addiction but also explained relationships between Smartphone usage, gratifications, and addiction among SQU undergraduates.

Keywords : Smartphone usage, Smartphone gratifications, Smartphone addiction, Uses and Gratifications Theory, Undergraduates. Sultan Qaboos University, Oman.

مستخلص : تناولت هذه الدراسة استخدام الهواتف الذكية وإشبعاتها وإدمانها بين طلبة المرحلة الجامعية الأولى في جامعة السلطان قابوس، باعتماد نظرية الاستخدامات والإشباع (UGT) كإطار عمل. تم تطبيق استبيانين حول استخدام الهواتف الذكية وإشبعاتها وإدمانها على عينة طبقية تضم (849) طالباً وطالبة (48.8% ذكور، 51.2% إناث). بالإضافة إلى ذلك، تم تنظيم أربع جلسات نقاش مع مجموعتين بؤرية باستخدام عينة من (16) طالباً وطالبة. أشارت النتائج الكمية إلى أن خدمات WhatsApp (الرسائل النصية) كانت الأكثر استخداماً ضمن تطبيقات الهواتف الذكية. وجاء البحث عن المعلومات والترفيه بواسطة الهواتف الذكية كظاهرة أكثر شيوعاً بين طلبة جامعة السلطان قابوس. كان المعدل السائد لإدمان الهواتف الذكية 33.1%، في حين أن تجاهل العواقب الضارة كان أكثر أعراض الإدمان شيوعاً بين هؤلاء الطلبة. لم تسلط النتائج النوعية الضوء على الأسباب الكامنة وراء إدمان الهواتف الذكية فحسب، بل أوضحت أيضاً العلاقات بين استخدام الهواتف الذكية والإشبعات والإدمان بين طلبة جامعة السلطان قابوس.

الكلمات الرئيسية : استخدام الهواتف الذكية، إرضاء الهواتف الذكية، إدمان الهواتف الذكية، نظرية الاستخدامات والإشباع، طلبة المرحلة الجامعية الأولى، جامعة السلطان قابوس، عمان.

Résumé : Cette étude a examiné l'utilisation du smartphone, les gratifications et la dépendance chez les étudiants de premier cycle à l'Université Sultan Qaboos (SQU), en adoptant la théorie des utilisations

et des gratifications (UGT) comme cadre. Deux questionnaires sur l'utilisation du smartphone, les gratifications et la dépendance ont été appliqués à un échantillon stratifié composé de (849) étudiants de premier cycle à la SQU (48,8 % hommes, 51,2 % femmes). De plus, quatre séances de discussion avec deux groupes de discussion ont été menées auprès d'un échantillon de (16) étudiants. Les résultats quantitatifs ont indiqué que les services WhatsApp/messages texte étaient les applications les plus utilisées pour les smartphones. La recherche d'information et de divertissements étaient les gratifications les plus courantes pour les smartphones parmi les étudiants de premier cycle à SQU. Le taux de dépendance au smartphone était de 33,1%, tandis que l'indifférence à l'égard des conséquences néfastes était le symptôme de dépendance le plus fréquent chez ces étudiants. Les résultats qualitatifs ont non seulement mis en évidence les raisons de la dépendance au smartphone, mais ont également expliqué les relations entre l'utilisation du smartphone, les gratifications et la dépendance chez les étudiants de premier cycle à SQU.

Mots-clés : Utilisation du smartphone, gratifications du smartphone, addiction au smartphone, théorie des usages et des gratifications, étudiants de premier cycle. Université Sultan Qaboos, Oman

Introduction

The Smartphone is one of the most prominent types of information and communication technology (ICT) device, which has shown the most spectacular development (Chóliz, 2012). It entered human life and affected directly and indirectly many aspects of human relationships and interactions and changed most aspects of everyday life (Szipakow, Stryzhak, & Prokopowicz, 2011). It has been changing the ways in which people communicate with each other, find information, have fun and manage their everyday lives. Furthermore, the recent developments of new operating systems, abundant applications and competition between vendors have facilitated a remarkable growth in the number of users (Park, Kim, Young & Shim, 2013).

As a result, Smartphone use is rapidly spreading worldwide. In fact, the number of smartphone users is predicted to grow from 2.1 billion in 2016 to around 2.5 billion in 2019, with smartphone penetration rates increasing as well. Just over 36 percent of the world's population is projected to use a smartphone by 2018, up from about 10 percent in 2011 (statista.com, 2018). Oman is no exception to this trend. Oman's mobile phone subscribers base crossed 7 million at the end of April 2017,

with a penetration rate of more than 150 per cent (timesofoman.com, 2018).

Today, the wide spread of Smartphones can be attributed to many factors, including their being fast, light, strong and ever more convergent. Likewise, Smartphones come with different features that attract users, such as a digital camera, movie camera, diary, phone book, GPS, radio, MP3 player, web browser, data storage device, encyclopedia, alarm clock, Dictaphone, personal organizer, flashlight and many more. All of these factors have encouraged the majority of people in developed as well as in developing countries to use mobile phones (Takao, Takahashi & Kitamura, 2009). Moreover, since the introduction of the iPhone, mobile phones with touchscreens have begun to dominate the Smartphone market (Henze, Rukzio, & Boll, 2012).

While Smartphone use has been increasing in all economic and age sectors, university students have been considered as one of the most important target markets and the largest consumer group for Smartphone services (Head & Ziolkowski, 2012). Similarly, Bianchi and Phillips (2005) revealed that problematic mobile phone usage was most widespread among younger users; hence, it is arguable that mobile phone addiction is most likely to occur among this group. Hong, Chiu and Huang (2012) argued that mobile phones are popular among university students because they increase their social communication and expand their opportunities for making social relationships.

Objectives of the study

The chapter aims to provide a comprehensive understanding of the Smartphone usage, gratifications, and addiction among undergraduates using UGT as a framework. In addition, it examines the relationship between Smartphone usage, gratifications, addiction and undergraduates' academic achievement.

Research questions

This study attempts to provide answers to the following research questions:

1. What are the most used Smartphone functions and applications among SQU undergraduates?
2. What are the main types of Smartphone usage behavior exhibited by SQU undergraduates based on their underlying motivation?

3. What Smartphone motives do SQU undergraduates gratify from Smartphone usage and addiction?
4. What are the prevalence rates of the various Smartphone addiction levels among SQU undergraduates?
5. What are the main symptoms of Smartphone addiction among SQU undergraduates?
6. What are the reasons behind Smartphone addiction among SQU undergraduates?

Hypotheses of the study

This study attempts to test the following hypotheses at the ($p < 0.05$) level of significance:

H1: There are significant relationship between Smartphone usage, gratifications, and addiction among SQU undergraduates.

H2: There are significant relationships between Smartphone usage, gratifications, and addiction and SQU undergraduates' academic achievement.

Significance of the study

The expected significance of this research is as follows:

1. To broaden our knowledge about Smartphone usage, gratifications, and addiction among undergraduates.
2. To provide exploratory insights into the nature of the Smartphone addiction problem: The prevalence rate of different Smartphone addiction levels, the symptoms of Smartphone addiction and the effects of Smartphone addiction on academic achievement among SQU undergraduates.
3. To determine the motives behind Smartphone use and addiction, as well as the types of Smartphone usage behavior associated with Smartphone addiction among undergraduates. Consequently, the study will increase the awareness of students, parents and teachers about risk factors associated with Smartphone addiction.
4. The findings of this study maybe useful to various parties, including university students, parents, educators, researchers and policy-makers.

Definition of the Concepts

Smartphones : These are advanced mobile phones that have the capabilities of a telephone, camera (still and video), music player and voice recorder and personal digital assistant. They are approaching the level of complexity of computers since they have similar applications such as mobile phone word processing, spreadsheets, email and Internet. The high level of interactivity of these mobile phones has led to their categorization as ‘Smartphones’ (Uys et al., 2012).

Smartphone Usage Behavioral Types : These are different types of behavior associated with Smartphone usage. The literature identifies six types: habitual, addictive, mandatory, voluntary, dependent and compulsive behavior (Hanley & Wilhelm, 1992; Hooper & Zhou, 2007; Madrid, 2003; Shambare, Rugimbana & Zhoua, 2012; O’Guinn & Faber, 1989).

Uses and Gratifications Theory (UGT) : This is a popular approach to exploring why and how people actively seek out specific media to satisfy specific needs. According to Blumler and Katz (1974), UGT is used to explain the motivations to use technologies, especially why consumers use media to satisfy their social and psychological needs. This study applies UGT in pursuit of the following three goals: to explain how students use Smartphones to gratify their needs, to discover the motives underlying students’ Smartphone addiction, and to explain relationship between Smartphone usage, gratifications and addiction.

Smartphone Gratifications : These are gratification motives that influence Smartphone usage behaviors and may cause addiction. The study proposes six Smartphone gratifications, each gratifying a different motive. Consequently, they can help in identifying the motives underlying Smartphone addiction. These gratifications include social interaction, freedom and privacy, self-express and gossip, information seeking and entertainment, self-developing and safety and self-identity and conforming.

DNA Wheel Measurement : This is a technique used to analyze the Genes of Smartphone by assessing the usage behavior of Smartphone users. Applying this technique in the present study allows identification of the particular Genes associated with Smartphone usage and addiction. Specifically, it allows examination of the motives that university students gratify through Smartphone usage and addiction. Glaser (2010) applied this technique to analyze the Genes of leadership -the characteristics of good leadership, identifying with great accuracy how people were

feeling, what they were thinking and what to focus on to bring out the most vital dynamics for achieving higher levels of growth, performance and success. In addition, Rodrigues, (2011) applied this technique in his study of the perceived impacts of Smartphone use on the performance of senior managers in South African firms.

Smartphone Addiction : ‘Addiction’ is defined in the dictionary as: (1) a functional abnormality of the body caused by food or pharmaceutical toxins ; (2) a pathologic condition that one cannot tolerate without the continuous administration of alcohol or drugs; and (3) the status of not being able to rationally judge or distinguish due to certain ideas or objects (Kwon et al., 2013, p. 1). This study defines Smartphone addiction as a type of behavioral addiction associated with a group of negative symptoms such as disregard of harmful consequences, preoccupation, inability to control craving, productivity loss and feeling anxious and lost. This study measured Smartphone addiction scores by calculating the six following Smartphone addiction indications: money spent, calls sent, calls received, messages sent, messages received and addiction symptoms. Based on that Smartphone users were classified into three levels of addiction- casual, moderate or heavy as follows:

- **Casual level of Smartphone addiction :** At this level of addiction users spent casual amount of money on their Smartphone bill monthly comparing to their income, sent and received casual number of calls and messages daily and showed the lowest level of addiction symptoms.

- **Moderate level of Smartphone addiction :** At this level users spent moderate amount of money on their Smartphone bill monthly comparing to their income, sent and received moderate number of calls and messages daily and showed a moderate level of addiction symptoms.

- **Heavy level of Smartphone addiction :** At this level users spent high amount of money on their Smartphone bill monthly comparing to their income, sent and received high number of calls and messages daily and showed the highest level of addiction symptoms.

Field of Study : This study divided SQU undergraduates according to their colleges into two groups: Physical Sciences or Social Sciences and Humanities.

Academic Achievement : The study classified SQU undergraduates’ academic achievement into three levels (high, middle and low) according to their GPA.

Literature review

This study conducts a review of the body of literature relating to Smartphone usage, gratifications and addiction from 2012 to 2018, as follows:

1. Smartphone Usage Behavior among University Students

Despite the recent huge rise in popularity of Smartphone use and their impact on users' lifestyles, few studies have been conducted on Smartphone usage patterns (Ahn, Wijaya, & Esmero, 2014). Therefore, this study will explore the types of Smartphone usage behavior and their association with Smartphone gratifications and addiction. Therefore, it is important to describe these usage types and their relationship with Smartphone gratifications and addiction by reviewing past studies. In this regard, Shambare, ugimbana, and Zhou (2012) identified the types of behavior associated with mobile phone usage among university students. They tried to determine whether students exhibited one type of behavior more than another or a set of behavior types more than others. They also attempted to categorize mobile phone usage according to the typologies that are commonly identified in the literature (addictive, compulsive, dependent, habitual, voluntary and mandatory).

Lee, Chang, Lin, and Cheng (2014), on the other hand, examined links between psychological traits and compulsive behaviors of Smartphone users, and looked further into the stress caused by those compulsive behaviors. The results suggested that compulsive usage of Smartphone and techno-stress were positively related to certain psychological traits, including locus of control, social interaction anxiety, materialism and the need for touch.

According to Fukuda, Asai, and Nagami (2015, October) users are gradually but steadily adopting WiFi at home, in offices, and public spaces over these three years. The majority of light users have been shifting their traffic to WiFi. Heavy hitters acquire more bandwidth via WiFi, especially at home. The percentage of users explicitly turning off their WiFi interface during the day decreases from 50% to 40%. In South Korea, Jeong, Kim, Yum, and Hwang (2016) examined the user characteristics and media content types that can lead to addictive behavior. With regard to user characteristics, results showed that those who have lower self-control and those who have greater stress were more likely to be addicted to smartphones. For media content types, those who use smartphones for SNS, games, and entertainment were more likely to

be addicted to smartphones, whereas those who use smartphones for study-related purposes were not.

Fullwood, Quinn, Kaye, and Redding (2017) found that using Smartphones to alleviate boredom had become habituated for some users. Findings also imply that users may not be attached to the device itself, but rather the affordances on offer. However, for Yang (2018) using a combination of Extended Technology Acceptance Model (TAM2) and consumer behavior theories can provide a better understanding of the planning, execution, and assessment of multi-platform advertising campaigns that affect users' usage behavior.

2. Smartphone Gratifications among University Students

A growing number of studies have applied UGT in investigating the gratifications of Smartphone usage among university students. Interestingly, Grellhesl and Punyanunt-Carter (2012) analyzed the most highly sought gratifications for using SMS text messaging among university students. They identified seven gratifications: Immediate access and mobility, relaxation and escape, entertainment, information seeking, coordination, socialization and affection, and status.

In Malaysia, Balakrishnan and Loo (2012) explored mobile phone and Short Message Service (SMS) usage among urbanized university students. They applied UGT to explore mobile phone purchasing factors, reasons behind the use of mobile phone and SMS, usage pattern and behavioral issues related to mobile phone and SMS. The results identified the following motives for using a mobile phone: Socializing, privacy, status symbol and safety. On the other hand, motives to use SMS included: To make/cancel appointments, gossip and maintain relationships, provides privacy, cheap, easy to use and quick..

In Korea, Kim and Shin (2013) examined Smartphone users' motivation and gratification based on UGT. They also examined the relationship between Smartphone usage motives and the level of gratification. The findings identified five motives: Accessibility, entertainment, social status, portability, and problem-solving capacity. The study also identified five factors of gratification: Entertainment, social homogeneity, quick information search, usefulness, and convenience. It is notable that entertainment and social homogeneity were the first gratification factors. Besides, among five using motives, influential orders were entertainment, social, usefulness, quickness. However, Sheldon and Bryant (2016) investigated motives for Instagram use. These were "Surveillance/Knowledge about others,"

“Documentation,” “Coolness,” and “Creativity.” Recently, Reid and Thomas (2017) indicated that the primary gratifications received from smartphone usage differed for each gender; for males, gratification from smartphone usage was more evenly spread across different gratification types, whereas females placed an overwhelming emphasis on social gratification. While both groups use smartphones primarily for their social connectedness, females value this more so. These findings highlight the diversity of uses and gratifications that the smartphone can satisfy, but this may come with a price.

3. Smartphone Addiction among University Students

Since this work aims to explore the nature of Smartphone addiction among SQU undergraduates, it is first important to discuss how previous studies identified this type of addiction, classified its various levels, determined the symptoms and, most important, how they measured it among university students.

Krajewska-Kulak et al. (2012) showed that most students had mobile phones. They usually used them for sending text messages, taking photos and accessing the Internet. Among these students, 35.2% of the Poles and 68.8% of the Belarusians were convinced on the harmful effects of mobile phones. However, more Polish than Belarusian respondents knew that mobile phone users could become addicted. Almost 1/5 of Polish students and 1/10 of the Belarusians had symptoms of mobile phone addiction.

In Korea, Kwon et al. (2013) developed the first scale of Smartphone addiction. It is a self-diagnostic scale that could distinguish Smartphone addicts based on the Korean self-diagnostic program for Internet addiction (K-scale) and the Smartphone's own features. In this study, each subject group was assessed and the respondents were divided into high-risk, low- to medium-risk, and general groups. The findings showed that Smartphone addiction rates of the high- risk and low- to medium-risk groups were 2.2 and 9.3% respectively in adolescents and 1.0 and 6.7% respectively in adults. Based on the factor analysis results, there were six subscales for Smartphone Addiction Scale (SAS): Daily-life disturbance, positive anticipation, withdrawal, cyberspace-oriented relationship, overuse and tolerance. While, Park (2014) investigated differences between Smartphone users with high and low addiction tendencies among Korean college students. The results revealed that more females than males exhibited high addiction tendency. Highly addicted Smartphone users have a greater level of motivation for chatting,

caring for others, and accessibility to others than the low addictive users. Addicted Smartphone users tend to prefer particular Smartphone activities, such as voice calls, social networking programs and chatting.

Moreover, Valderrama (2014) developed the problematic Smartphone use scale (SPUS). He found strong positive relationships between the Internet Addiction Test (IAT) and the (SPUS), providing evidence of convergent validity. Furthermore, evidence of good-to-excellent internal consistency was found for two of the scale's factors: Problematic use and mood modification. These results supported the use of the PSUS as a measure for problematic Smartphone use.

Demirci, Orhan, Demirdas, Akpınar, and Sert, (2014) found that (13.3%) of the students considered themselves as addicted to their Smartphone, while (60.5%) of the students considered themselves to be not addicted, and (26.2%) of the students were unsure. In addition, total scores on Smartphone addiction were significantly higher for females than for males. Likewise, the average scale scores were the highest in users who used Smartphones for over 16 hours.

In Holland, Bolle (2014) suggested that Smartphone addiction could develop through habit. The result revealed that younger users are more vulnerable to develop this type of addiction, especially when they have higher levels of social stress, are weak at self-regulation, and extensively use their Smartphones for social and process purposes. Moreover, females were somewhat more sensitive to develop addiction because of their higher rates of social stress and social usage. However, in Turkey, Gökçearslan, Mumcu, Haşlaman, & Çevik (2016) investigated the roles of smartphone usage, self-regulation, general self-efficacy and cyber loafing in smartphone addiction. The results showed that both the duration of smartphone usage and cyber loafing positively affected smartphone addiction. The effect of self-regulation on smartphone addiction was negative and significant. In the same way, Pearson and Hussain (2017) investigated the relationship between smartphone use, narcissistic tendencies and personality as predictors of smartphone addiction. The results revealed that 13.3% of the sample was classified as addicted to smartphones. Higher narcissism scores and neuroticism levels were linked to addiction. Three themes of social relations, smartphone dependence and self-serving personalities emerged from the qualitative data. Interpretation of qualitative data supports addiction specificity of the smartphone. It is suggested that smartphones encourage narcissism, even in non-narcissistic users.

4. The relationship between Smartphone usage, gratifications, and addiction

There is some controversy among researchers regarding the relation between Smartphone usage, gratification and addiction. Whilst some researchers have found no relation between them (Song, Larose, Eastin, & Lin, 2004), others have claimed that enjoyable gratification seeking leads to habit and, finally, to addiction through operant conditions (Bolle, 2014). However, this study aims to apply UGT to provide better understanding of Smartphone usage, gratifications, and addiction and relationship between them. In addition, the UTG can improve our understanding of gratifications obtained from social networking via a Smartphone, since it considers university students as motivated users. Particularly, to examine why and how university students use the Smartphone for social networking in order to gratify a need, the underlying motivational purposes, and what leads them to addiction.

Recently there has been a revival of UGT research in the form of a growing number of UGT studies to investigate the gratification motives of mobile usage among university students (e.g. Balakrishnan & Loo, 2012 ; Grellhesl & Punyanunt-Carter, 2012). In this regard, Bolle (2014) indicated that the difference between internet and Smartphone addiction is in the usage gratifications and usage context of the two. Smartphones have different gratifications or features that can produce strong positive reinforcements, such as a pleasurable experience.

5. The relationship between Smartphone usage, gratifications, addiction and academic achievement

Since this research is partially concerned with examining relationship of Smartphone usage, gratifications, and addiction with academic achievement, it is important to discuss both the positive and negative effects of Smartphones on academic achievement. In this regard, some previous studies have highlighted the positive role of Smartphones in advancing students' learning. For example, Cheon, Lee, Crooks and Song (2012) reported that advancements in mobile technology are rapidly widening the scope of learning in areas outside formal education by allowing flexible and instant access to rich digital resources.

However, Casey's (2012) found that the lower the grade of the students, the higher the likelihood that they would become addicted to Smartphones. In addition, Hong et al. (2012) found that female university students showed a high level of mobile phone addiction which affected their academic achievement, including time management and other

related problems. In order to decrease their addiction, the study recommended that those students should engage in fun activities with others. Similarly, Kuznekoff & Titsworth (2013) found that students who were not using their mobile phones during the lecture wrote down 62% more information in their notes. They also took more detailed notes, were able to recall more detailed information from the lecture, and scored a full letter grade and a half higher on a multiple-choice test than those students who were actively using their mobile phones during the lectures.

Recently, some researchers have focused on examining how social media sites addiction through Smartphone chatting affects university students' academic achievement. In this regard, Daffalla and Dimetry (2014) pointed out that in 7 out of 10 students, academic achievement was affected negatively by their use of social networking programs, especially Facebook and WhatsApp. In like manner, Bijari, Javadinia, Erfanian, Abedini, and Abassi (2013) reported a negative relationship between SNs usage and students' GPA. Likewise, Kibona and Mgaya (2015) found out the impact of smartphones on academic performance of higher learning students. Nevertheless, Tavakolizadeh, Atarodi, Ahmadpour, and Pourgheisar (2014) found no significant relationship between excessive mobile phone use and students' academic achievement.

Some previous studies highlighted the gratifications of SNs usage and how they affect academic achievement among university students. For example, Muriithi and Muriithi (2013) found that connecting to classmates, sending messages, opinions and updates, socializing, chatting and updating their profiles were the most common SNs gratifications among university students. Conversely, those students might be expected to use SNs to raise their academic achievement. However, Bröns, Greifeneder and Støvring (2013) produced a different result, reporting that students seek gratifications of information sharing, as well as to express their opinions, in particular for academically related purposes.

Samaha and Hawi (2016) explored whether satisfaction with life mediated by stress and academic achievement facilitates smartphone addiction. The results showed that smartphone addiction risk was positively related to perceived stress, but the latter was negatively related to satisfaction with life. Additionally, a smartphone addiction risk was negatively related to academic achievement, but the latter was positively related to satisfaction with life. Recently, according to Sage and Burgio (2018), some neurodevelopmental and neurobehavioral changes occur

due to exposure to wireless technologies, such as symptoms of retarded memory, learning, cognition, attention, and behavioral problems.

Research methodology

A mixed-approach investigation was applied to achieve the objectives of the study. A stratified sample of 5% (n=849) of SQU undergraduates was selected to collect the data through the study questionnaires. Additionally, four discussion sessions with two focus groups were conducted using a sample of (16) students. The study used two tools to collect the quantitative data.

Population and Sampling

The study population

The population of this study consisted of SQU undergraduates. It included (16,961) students at SQU, distributed by gender and colleges according to statistics of the Deanship of Admissions and Registration in fall 2013, as shown in table (1).

Table 1 : Distribution of the population of the study by gender and college

Field of study	College	Gender			Total
		M	F	Total	
Social Sciences and Humanities	Arts and Social Sciences	908	1668	2576	8279
	Economics and Political Sciences	1343	1319	2662	
	Education	900	1186	2086	
	Law	565	390	955	
Physical Sciences	Nursing	116	297	413	8682
	Medicine and Health Sciences	408	624	1032	
	Sciences	1316	1580	2896	
	Agriculture and Marine Sciences	727	767	1494	
	Engineering	2171	676	2847	
Total		8454	8507	16961	

The study samples

1. Quantitative study sample : A stratified sample of around 5% (n=849) of SQU undergraduates was selected in order to collect data that would answer the research questions and test the hypotheses. The sample represented gender (male and female) and field of study (Physical Sciences and Social Sciences and Humanities), as shown in table (2).

Table 2 : Distribution of quantitative study sample by gender and college

Field of study	College	Gender			Total	
		M	F	Total	N	%
Social Sciences and Humanities	Arts and Social Sciences	71	116	187		
	Economics and Political Sciences	82	48	130	411	48.4
	Education	21	43	64		
	Law	14	16	30		
	Nursing	10	50	60		
Physical Sciences	Medicine and Health Sciences	12	34	46		
	Sciences	82	57	136	438	51.6
	Agriculture and Marine Sciences	29	51	80		
	Engineering	93	20	113		
Total	N	414	435		849	
	%	48.8	51.2			

Table 3 : Distribution of respondents' by parents' education level

Parents' education level			Gender		Total	
			M	F	N	%
Fathers	Can't read or write	Low	226	220	446	52.5
	Read & write					
	12th grade	Middle	118	132	250	29.5
	Diploma					
	Bachelor	High	70	83	153	18
	Master					
	Doctorate					
Total			414	435	849	100
Mothers	Can't read or write	Low	310	296	606	71.4
	Read & write					
	12th grade	Middle	77	105	182	21.5
	Diploma					
	Bachelor	High	27	34	61	7.1
	Master					
	Doctorate					
Total			414	435	849	100

Table 4 : Distribution of respondents' by family income level

Family income level	Gender		Total	
	M	F	N	%
Low	143	139	282	33.2
Middle	235	230	465	54.8
High	36	66	102	12
Total	414	435	849	100

Table 5 : Distribution of respondents' based on academic achievement level

Academic achievement level		Gender		Total	
		M	F	N	%
less than 2.00	Low	124	57	181	21.3
2.00-2.29					
2.30-2.74	Middle	262	321	583	68.7
2.75-3.29					
3.74-3.30	High	28	57	85	10
3.75-4.00					
Total		414	435	849	100

Tables (1-5) illustrate the following characteristics of the quantitative study respondents:

- Demographic characteristics of the respondents :

Out of the 849 respondents in this study, 51.2% were male students (n=414) and 48.81% were female students (n=435). Moreover, 48.4% (n=411) of the students were from Social Sciences and Humanities colleges, while the remaining 51.6% (n= 438) were from Physical Sciences colleges. Regarding their father's education level, respondents were divided into three groups as follows: 52.5% (n=446) of fathers were low-educated, 29.5% (n=250) of fathers were middle-educated, and 18% (n=153) of fathers were high educated. Meanwhile, the mother's education levels were distributed as follows: 71.4% (n=606) of mothers were low-educated, 21.5% (n=182) of mothers were middle-educated and 7.1% (n=61) of mothers were high-educated. In relation to their families' income level, the respondents were distributed as follows: 12% (n=102) were from low-economic families, 54.8% (n=465) were from middle-economic families and 33.2% (n=282) were from high-economic families. With regard to their academic achievement, 21.3% (n=181) of respondents were lower-grade students, 68.7% (n= 583) were middle-grade students, and 10% (n=85) were higher-grade students.

- Behavioral characteristics of the respondents :

All of the respondents had Smartphones. 19.2% of them had more than one phone. The majority (66.2%) used iPhones, 23.4% used Samsung Galaxy phones, 6.8% used Blackberry phones, and 3.5% used Nokia phones. On average, respondents had been using their Smartphone

for (1-5) years. As the majority were first or second year students, it seems that most of them acquired their Smartphones when they entered university. The majority (89.6%) of the respondents made (1-4) calls per day and 81.1% received (1-4) calls per day. In addition, the majority (75.8%) made more than 10 messages per day and 82.8% received more than 10 messages per day. Regarding the people to whom respondents most often talked using Smartphones, 41.0% said “family members”. However, 60.4% most often sent messages to friends and colleagues. In terms of the time of day when they most often used their Smartphones, the majority (68.9%) used their phones most often “in the evening”. This is understandable given that those students were in class during the day. As for their bill payments, 77.9% spent (1-15) Omani Rials per month.

2. Qualitative study sample : Sixteen SQU undergraduates took part in the focus group discussions. There were two separate discussion groups, one comprising Social Sciences and Humanities students and the other comprising Physical Sciences students. These sixteen students participated voluntarily in the focus group discussions. In total, four focus group discussion sessions took place, at locations convenient to the students. Two sessions were conducted for each focus group in order to collect the required qualitative data, each of which comprised eight students. This sample represented gender 50% (n=8 males) and 50% (n=8 females) and field of study 50% (n=8 Physical Sciences) and 50% (n=8 Social Sciences and Humanities). Participants’ demographics are presented below in table 6:

Table 6 : Demographic information of the focus group participants

Group	P. NO	Gender & age	College	Type of Smartphone	Parent education level		Family income level	Academic achievement
					Father	Mother		
Focus groups (1)	P1	M, 20	Social Sciences & Humanities	IPhone	High	High	high	Middle
	P2	M, 19		IPhone	Middle	Low	middle	Middle
	P3	M, 22		IPhone	Low	Middle	middle	Middle
	P4	M, 24		Samsung, galaxy	Middle	Low	middle	Middle
	P5	M, 22		Samsung, galaxy	Low	Low	low	Middle
	P6	F, 20		IPhone	High	Middle	high	High
	P7	F, 22		IPhone	Middle	Low	high	Middle
	P8	F, 21		Samsung, galaxy	Middle	Middle	middle	Middle

Focus groups (2)	P9	M, 24	Physical Sciences	IPhone	Low	Low	middle	High
	P10	M, 20		Samsung, galaxy	Low	Low	low	Middle
	P11	M, 20		Blackberry	High	Middle	high	High
	P12	F, 18		IPhone	High	high	high	Middle
	P13	F, 19		IPhone	Middle	Low	middle	High
	P14	F, 20		IPhone	Middle	middle	middle	High
	P15	F, 21		Samsung, galaxy	Low	Low	low	High
	P16	F, 24		Samsung, galaxy	Low	Low	low	Middle

NOTE: P= participant

Table (6) illustrates the following characteristics of the qualitative study participants:

- Out of the sixteen participants in the study, eight were female students and eight were male students.
- Ten students were (18-21) years old, while six were (22-24) years old.
- Eight students were from Social Sciences and Humanities colleges, while eight students were from Physical Sciences colleges.
- All sixteen students used Smartphones: Nine students had iPhones, six had a Samsung Galaxy, and one had a Blackberry.
- Four of the sixteen students indicated that they were from low-economic families, seven were from middle-economic families, and five were from high-economic families.
- With respect to their father's education level: Six of the sixteen students indicated having low-educated fathers, six fathers were middle-educated, and four fathers were high-educated. In contrast, according to their mother's education level, nine of the mothers were low-educated, five mothers were middle-educated, and only two mothers were high-educated.
- Ten of the sixteen students were middle-grade students, and six students were higher-grade students.

1. Smartphone Addiction Questionnaire (SPAQ)

To assess the extent to which SQU undergraduates are addicted to Smartphone use, previous questionnaires were adapted and modified to measure Smartphone addiction among SQU undergraduates. This questionnaire was adapted from those used by Walsh (2009) and Casey (2012). The new questionnaire cronbach's alpha Coefficient was (0.76). It consisted of 39 items and utilized a five- point Likert-type scale. The questionnaire has four subscales, as follows:

a. Smartphone information: Seven questions were included to collect information regarding the behavioral characteristics of the respondents. These included questions about the number of phones they owned, kind of Smartphone, usage hours, money spent on Smartphone bill, ... etc.

b. Smartphone general Usage Rate: The questionnaire included five items regarding Smartphone use, including the average number of calls sent, calls received, texts sent and texts received every day, in order to measure the level of use as identified by Walsh (2009). The purpose of these questions was to identify the amount of time students allocated to the use of Smartphones and the amount of money they spent on the performance of a number of functions through Smartphones use (e.g. "How many calls would you make on your Smartphone per day?").

c. Smartphone functions and applications level of usage: Seventeen items were included to cover the level of usage to Smartphone different functions and applications. The purpose of these items was to identify the most used Smartphone's functions and applications among users (e.g., "How often do you use your Smartphone to do the following: Send WhatsApp\SMS messages, use the internet, set the alarm or reminders, take pictures, chat via social networking programs, listen to audio clips, use the calendar, voice calls, etc.)").

d. Smartphone Addiction Symptoms Appearance Rate: This subscale included seventeen items to cover symptoms of Smartphone addiction, distributed in a five-factor Smartphone addiction profile as identified by Casey (2012). These factors were: Disregard of harmful consequences (items: 1, 2, 3, 4), preoccupation (items: 7, 9, 10), inability to control craving (items: 5, 6, 11, 12), productivity loss (items: 13, 14, 15) and feeling anxious and lost (items: 8, 16, 17). The purpose of these items was to identify the frequency of the appearance of Smartphone addiction symptoms among users.

2. Smartphone Usage Behavior Questionnaire (SPUBQ)

To obtain quantitative data to explore the Genes (Gratification) and the types of Smartphone usage behavior, a questionnaire was developed to measure these Genes and types, using the UGT as a framework. The questionnaire benefited from: Hooper and Zhou, (2007), Glaser, (2010), Grellhesl and Punyanunt-Carter (2012) instruments. The questionnaire, which consisted of 42 items and utilized a five- point Likert-type scale, was designed to provide information illustrating the Smartphone gratification as well as the types of usage behavior that reflect these motives. This questionnaire measured both the gratifications and the types of Smartphone usage behavior. The cronbach's alpha Coefficient for the questionnaire was (0.91). Below is a description of the questionnaire's various subscales:

a. Smartphone gratifications: This subscale measures six gratifications that influence Smartphone users' usage behavior and each one gratifies seven motives (items) as follows:

i. Social interaction: Seven items were included to cover the use of Smartphone for purposes of social interaction, such as to stay in touch with their friends and families (e. g., "I use my Smartphone to activate ongoing communication with others"). These were items (1, 2, 3, 4, 5, 6, and 7).

ii. Information sharing and entertainment: Seven items were included to cover the use of Smartphone for the purposes of information sharing and entertainment. These items explained the role of Smartphone as an essential tool in students' life for seeking information, sharing experiences and collaboration with others. Moreover, they also reflected the acquisition of Smartphones for study-related reasons (e.g. "I need my Smartphone to exchange information and experiences with colleagues"). They also reflected how the students used their phones for entertainment purposes, for instance, to play games, listen to music, watch movies...etc. (e.g., "I use the entertainment programs in my Smartphone, for example: Video player, audio player and games to get rid of my boredom and to have fun."). These were items (8, 9, 10, 11, 12, 13, and 14).

iii. Self-identity and conforming: Seven items were included to cover the use of Smartphone for the purpose of self-identity and conforming. These items illustrated how some students see Smartphones as giving status or conforming group identity. In this regard, the Smartphone and its usage help students personalize their phones, express themselves and conform to belonging to a particular group of friends (e. g. "I change my

Smartphone constantly because it makes me feel special among my friends”). These items were (15, 16, 17, 18, 19, 20, and 21).

iv. Self-developing and safety: Seven items were included to cover the use of Smartphone for the purpose of self-developing and safety. These items reflected the reasons mentioned for purchasing a Smartphone, which were included to enhance self-completeness and to feel safe, deal with conflict situations, increase self-confidence, parents’ belongingness and ideas diffusion (e. g., “I bought a Smartphone to help me in emergency situations.”). These items were (22, 23, 24, 25, 26, 27, and 28).

v. Freedom and privacy: Seven items were included to cover the use of Smartphone for the purpose of freedom and privacy. These items were (29, 30, 31, 32, 33, 34, and 35). They reflected the role of Smartphone in providing privacy and giving the student freedom to contact people at any time, which must be associated with responsibility and respect of others’ privacy (e. g., “My Smartphone gives me the freedom to contact any person at any time”).

vi. Self-express and gossip: Seven items were included to cover the use of Smartphone for the purpose of self-express and gossip. These items were (36, 37, 38, 39, 40, 41, and 42). They clarified the role of Smartphone in enabling students to express their feelings and opinions and to keep in touch, but also to engage in more extended gossiping with friends and families (e. g., “Smartphone apps offer me the chance to meet new friends and exchange views with them.”).

b. Types of Smartphone usage: This subscale measures six types of Smartphone usage behavior, as follows:

i. Addictive behavior: Seven items were included to cover the use of Smartphone as an addictive type of behavior. These items were (20, 29, 32, 34, 35, 37, and 39). These items reflected the users’ excessive usage of Smartphone, with continued use in spite of negative outcomes (e. g., “I use my Smartphone to escape from the worries of everyday life.”).

ii. Compulsive behavior: Seven items were included to cover the use of Smartphone as a compulsive type of behavior. These items were (16, 17, 18, 19, 21, 31, and 40). These items reflected the users’ irrational need to use Smartphone, often despite negative consequences and it is usually periodic (e. g., “I usually ignore the harmful consequences of spending too much time talking on my Smartphone simply because I cannot live without it.”).

iii. Dependent behavior: Seven items were included to cover the use of Smartphone as a dependent type of behavior. These items were (8, 9, 12, 13, 14, 36, and 42). These items reflected the users' reliance on Smartphones to contact others and perform other functions (e. g., "I rely on my Smartphone to share knowledge with others in my specialty.").

iv. Habitual behavior: Seven items were included to cover the use of Smartphone as a habitual type of behavior. These items were (1, 2, 5, 6, 15, 33, and 38). These items reflected users' automatic and routine behavior that they repeat, because it is easy, comfortable or rewarding (e. g., "I am used to carrying my Smartphone in my hand, even when I do not need it.").

v. Voluntary behavior: Seven items were included to cover the use of Smartphone as a voluntary type of behavior. These items were (3, 4, 7, 10, 26, 30, and 41). These items reflected the users' reasoned behavior, driven by specific motivations like social and personal benefits (e. g., "Because of my Smartphone I was able to develop my social relationships and gain popularity among my friends.").

vi. Mandatory behavior: Seven items were included to cover the use of Smartphone as a mandatory type of behavior. These items were (11, 22, 23, 24, 25, 27, and 28). These items reflected behavior which is required to be done, followed, or complied with by the user, usually because it is driven or prompted by environmental consequences (e. g., "I bought a Smartphone so my parents can check up on me at any time.").

3. Focus Group Discussion Guide

The researchers designed a focus group discussion guide comprising a series of focusing statements and open-ended questions, to initiate a discussion among a small sample of SQU undergraduates. Topics included their points of view with regard to the reasons behind Smartphone addiction and explaining the relationships between Smartphone usage, gratifications, and addiction among SQU undergraduates.

Findings

1. The most used Smartphone functions and applications among SQU undergraduates

The means and standard deviations for each of Smartphone functions and applications were calculated. Then based on the means, these functions and applications were organized under categories from

the most common to the least common among SQU undergraduates as follows: Casual usage (1-2.29), Moderate usage (2.30-3.59), and Heavy usage (3.60-5.00).

Table 6 : Means (M) and standard deviations (SD) of Smartphone functions and applications usage among SQU undergraduates

Smartphone functions and applications		M	SD	Level of usage
1.	Send WhatsApp messages	4.53	0.79	Heavy usage
2.	Use the Internet	4.44	0.91	
3.	Set the alarm or reminders	4.32	1.04	
4.	Take pictures	4.25	0.98	
5.	Chat via social networking programs (Facebook, Twitter, etc.)	4.08	1.14	
6.	Listen to audio clips	3.82	1.16	
7.	Use the Calendar	3.68	1.16	
8.	Voice calls	3.66	1.17	
9.	Watch video clips	3.51	1.25	Moderate usage
10.	Use the notepad	3.29	1.38	
11.	Receive or send e-mails	3.18	1.33	
12.	Use the calculator	3.13	1.37	
13.	Use the games	2.97	1.38	
14.	Download ringtones, games and programs	2.71	1.12	
15.	E-shopping	2.22	1.39	Casual usage
16.	Use the GPS maps and GRS	2.27	1.33	
17.	Vote for television programs and competitions	1.49	1.08	

The results in table 6 show the levels of usage of Smartphone functions and applications categorized into three levels based on their means. It is clear that at the heavy usage level, sending messages was the heaviest Smartphone function among SQU undergraduates (4.53), followed by using the Internet (4.44), while making voice calls was the least. At the moderate level of usage, watching video clips was the most used function (3.51), while download ringtones, games and programs was the least used activity (2.71). Finally, electronic shopping, use of the GPS maps and GRS and voting for television programs and competitions were at the casual level of Smartphone usage.

2. The main types of Smartphone usage behavior exhibited by SQU undergraduates

The means and standard deviations for each type of Smartphone usage behavior were calculated

Table 7 : Means (M) and standard deviations (SD) of the types of Smartphone usage behavior among SQU undergraduates (N=849)

The Main Types of Smartphone Usage Behavior		M	SD
1.	Voluntary Usage Behavior	3.68	.61
2.	Dependent Usage Behavior	3.65	.64
3.	Mandatory Usage Behavior	3.29	.49
4.	Habitual Usage Behavior	3.00	.59
5.	Addictive Usage Behavior	2.88	.77
6.	Compulsive Usage Behavior	2.82	.71

The results in table 7 show that voluntary behavior was the most common type of Smartphone usage behavior among SQU undergraduates (3.68), followed by dependent behavior (3.65) and mandatory behavior (3.29), while compulsive behavior was the least common type of Smartphone usage behavior among SQU undergraduates (2.82).

3. Smartphone motives underling SQU undergraduates Smartphone usage and addiction

The means and standard deviations for each Smartphone Gene were calculated.

Table 8 : Means (M) and standard deviations (SD) of the Smartphone Gratifications among SQU undergraduates (N=849)

The Genes of Smartphone		M	SD
1.	Seeking information and entertainment	3.92	.80
2.	Social interaction	3.48	.52
3.	Self-developing and safety	3.19	.49
4.	Self-express and gossip	2.95	.49
5.	Self-identity and conforming	2.95	.82
6.	Freedom and privacy	2.83	.62

The results in table 8 reveal that the seeking information and entertainment was the most common Smartphone gratification among SQU undergraduates (3.92), followed by social interaction (3.48), and then by self-developing and safety (3.19). This was followed by self-express and gossip, and self-identity and conforming (2.95) together.

4. The prevalence rates of the various Smartphone addiction levels among SQU undergraduates

Smartphone addiction average scores for SQU undergraduates were calculated by assessing the Smartphone addiction indicators collected from (22 items) in the Smartphone addiction questionnaire. Based on their overall average score on Smartphone addiction SQU undergraduates were classified under three groups- casual level, moderate level and heavy.

Table 9 : Prevalence rates of Smartphone addiction levels among SQU undergraduates (N=849)

Smartphone Addiction Levels	Addiction score		Prevalence rate	
	M	SD	N	%
Casual (1-2.29)	1.73	0.56	43	5.1
Moderate (2.30-3.59)	2.95	0.78	525	61.8
Heavy (3.60-5.00)	3.97	0.66	281	33.1

Note: M=Means, SD=Standard deviation, N= Number of size

The results in Table (9) reveal that moderate Smartphone addiction was the most prevalent level among SQU undergraduates (61.8%), followed by the heavy level (33.1%) and finally the casual level (5.1%).

5. The main symptoms of Smartphone addiction among SQU undergraduates

The means and standard deviations were calculated for each factor of Smartphone addiction symptoms (Table 10).

Table 10 : Means (M) and standard deviations (SD) of Smartphone addiction factors (N=849)

The factors of Smartphone addiction symptoms		M	SD
1.	Disregard of harmful consequences	3.76	.84
2.	Productivity loss	3.52	.95
3.	Inability to control craving	3.39	.88
4.	Feeling anxious and lost	3.26	1.08
5.	Preoccupation	3.02	1.08

The results in table (10) show the main symptoms of Smartphone addiction among SQU undergraduates, organized based on their means. It is clear that the most common symptom was “disregard of harmful consequences” (3.76), followed by “productivity loss” (3.52), then “inability to control craving” (3.39), then “feeling anxious and lost” (3.26) and finally “preoccupation” (3.02). To sum up, “Disregard of harmful consequences” was the most common symptom, while “preoccupation” was the least common.

6. The reasons behind Smartphone addiction among SQU undergraduates

All focus group participants offered seven reasons behind Smartphone addiction among SQU undergraduates. Five of these reasons related to students’ Smartphone overuse, while two reasons related to Smartphone manufacturers. The reasons that related to students included: (1) Using Smartphones extensively to entertain themselves in order to escape from academic pressure; (2) Using Smartphones for self-expression, especially through SNs; (3) Over depending on certain Smartphone functions and Apps to accomplish their academic work; (4) The negative desire for excellence through experiencing new devices and apps before others; and (5) Addict chatting via SNs to maintain and develop social relationships. In sequence, comments illustrating each reason are provided as follows:

– *In my opinion, with respect to Smartphone addiction among SQU undergraduates, I think one of the reasons is the need for entertainment. Because of the academic pressure, it appears that some students seek entertainment through listening to music or video games, whereas others prefer communication functions such as talking and texting. (P14)*¹

¹ (P n) = Participant number in the focus group discussion.

– Some SQU undergraduates become addicted to Smartphone usage because it enables them to express themselves. Shy students can easily express their opinions, feelings and emotions by chatting through social media networking sites. They prefer to interact in the virtual world via Smartphone more than the real world. (P7)

– Most students depend on Smartphones' functions and applications to organize their daily work, but some students are addicted to using these devices because they depend on them too much, for example, they cannot finish their assignments without using their Smartphones. (P10)

– Another reason behind Smartphone addicted among the students was the desire for excellence among peers through experiencing new devices and applications before others, which makes them seek continually to discover more apps. (P8)

– Chatting via social media networking apps using Smartphones is the easiest way to maintain friendships and increase social interactions. Despite that, some students chat online mainly to keep in contact with family members and friends. However, many students become addicted to chatting in a way that distracts them from their normal life and affects their academic achievement. (P13)

Likewise, the focus group participants presented two reasons relating to Smartphone manufacturers: 1) Continuous upgrading of Smartphone devices, and 2) Attracting young consumers by developing new apps. Two of the participants clarified these reasons:

– I think that the Smartphones manufacturers play an important role in making people addicted to Smartphone use. For example, they continue to upgrade these devices and develop new functions and applications to increase their benefits, which forces the consumer to change their devices constantly to follow these changes. As a result, the customers' usage rate continues to increase. (P 5)

– Smartphones manufacturers gain benefits by attracting young customers through developing new applications in a way that keeps customers busy with activities to download and experience using the latest applications. (P 6)

7. The relationship between Smartphone addiction, gratifications, and usage types among SQU undergraduates

- Pearson Correlation Coefficients between Smartphone addiction average score and the Smartphone gratifications were calculated.

Table 11 : Results of correlations between Smartphone addiction and Smartphone gratifications

Dependent Variables	Correlations	P
Smartphone Addiction × Social Interaction	-.04	.245
Smartphone Addiction × Freedom and Privacy	.05	.165
Smartphone Addiction × Self-Express and Gossip	.15**	.01
Smartphone Addiction × Self-Developing and Safety	.16**	.01
Smartphone Addiction × Self-Identity and Conforming	.12**	.01
Smartphone Addiction × Seeking Information and Entertainment	.01	.75

The results in table 11 reveal significant correlation between Smartphone addiction and three of the Smartphone gratifications: Self-express and gossip, self-developing and safety, and self-identity and conforming. However, there was no significant correlation between Smartphone addiction average score and three other Smartphone gratifications: Social interaction, freedom and privacy and seeking information and entertainment.

- Pearson Correlation Coefficients between Smartphone addiction average score and the types of Smartphone usage behavior were calculated.

Table 11 : Results of correlations between Smartphone addiction and types of Smartphone usage behavior

Dependent Variables	Correlation	P
Smartphone Addiction × Addictive Behavior	0.16**	0.01
Smartphone Addiction × Compulsive Behavior	0.15**	0.01
Smartphone Addiction × Dependent Behavior	0.03	0.46
Smartphone Addiction × Habitual Behavior	0.12**	0.00
Smartphone Addiction × Voluntary Behavior	0.04	0.20
Smartphone Addiction × Mandatory Behavior	-0.01	0.80

The results in table 11 reveal that there were significant relationships between Smartphone addiction average and three types of Smartphone usage behavior: Addictive, compulsive and habitual. Nevertheless, there were no significant differences between Smartphone addiction average score and three other types of Smartphone usage behavior: Dependent, voluntary and mandatory.

8. The differences in Smartphone usage, gratifications, and addiction among SQU undergraduates related to academic achievement

- First, the means and standard deviations for each type of Smartphone usage behavior among SQU undergraduates were calculated. Then, One-Way ANOVA testing was conducted to test the effect of the academic achievement levels- high, middle and low.

Table 12 : Results of One-Way ANOVA for types of Smartphone usage behavior among SQU undergraduates related to their academic achievement

Dependent Variable	Academic Achievement	N	M	SD	f-value	P
Addictive Behavior	High	181	2.80	.78	1.26	0.28
	Middle	583	2.89	.77		
	Low	84	2.95	.73		
Compulsive Behavior	High	181	2.76	.75	0.66	0.51
	Middle	583	2.83	.70		
	Low	84	2.82	.67		
Dependent Behavior	High	181	3.71	.64	1.36	0.25
	Middle	583	3.62	.63		
	Low	84	3.64	.63		
Habitual Behavior	High	181	2.99	.62	0.19	0.82
	Middle	583	3.00	.57		
	Low	84	3.03	.61		
Voluntary Behavior	High	181	3.69	.62	0.78	0.45
	Middle	583	3.68	.60		
	Low	84	3.60	.65		
Mandatory Behavior	High	181	3.28	.50	1.24	0.28
	Middle	583	3.28	.50		
	Low	84	3.37	.42		

Note: M=means, SD=Std. Deviation

According to the results in table 8 no significant differences were observed among SQU undergraduates in any types of Smartphone usage behavior according to their academic achievement levels.

- Second, the means and standard deviations as well as One-Way ANOVA test were calculated for each Gene of Smartphone usage behavior among SQU undergraduates according to their academic achievement. The students' academic achievement was classified into three levels (high, middle and low) in order to test their effect on the Smartphone gratifications among them (Table 9).

Table 13 : Results of One-Way ANOVA for the gratifications of Smartphone among SQU undergraduates related to their academic achievement

Smartphone gratifications	Academic Achievement	N	M	SD	F	P
Social Interaction	High	181	3.47	.52	1.01	.36
	Middle	583	3.49	.50		
	Low	84	3.40	.57		
Freedom and Privacy	High	181	3.99	.76	1.17	.31
	Middle	583	3.88	.81		
	Low	84	3.93	.75		
Self-express and Gossip	High	181	2.92	.85	.11	.89
	Middle	583	2.95	.80		
	Low	84	2.96	.80		
Information Seeking and Entertainment	High	181	3.16	.50	1.75	.18
	Middle	583	3.19	.49		
	Low	84	3.28	.45		
Self-Developing and Safety	High	181	2.78	.62	1.12	.33
	Middle	583	2.83	.62		
	Low	84	2.89	.56		
Self-Identity and Conforming	High	181	2.91	.54	.69	.51
	Middle	583	2.96	.46		
	Low	84	2.94	.49		

Note: M=means, SD=Std. Deviation.

The results in table 13 demonstrate no significant differences in Smartphone gratifications among SQU undergraduates according to the students' academic achievement.

• Third, the means and standard deviations for each Smartphone addiction indicator were calculated according to the students' academic achievement, which was divided into three levels (high, middle and low). Then One-Way ANOVA testing was applied to test the effect of academic achievement on the Smartphone addiction indicators, (Table13).

Table 14 : Results of One-Way ANOVA for Smartphone addiction among SQU undergraduates related to their academic achievement

Smartphone Addiction Indicators	Academic Achievement	N	M	SD	f-value	P
Money Spent	High	181	1.31	.62	1.32	.27
	Middle	583	1.26	.53		
	Low	84	1.20	.46		
Calls Sent	High	181	1.60	.93	1.73	.18
	Middle	583	1.49	.78		
	Low	84	1.41	.85		
Calls Received	High	181	2.04	1.26	7.08***	.01
	Middle	583	1.71	.93		
	Low	84	1.76	1.01		
Messages Received	High	181	4.36	1.21	1.24	.29
	Middle	583	4.51	1.05		
	Low	84	4.42	1.11		
Messages Sent	High	181	4.33	1.25	7.68***	.01
	Middle	583	4.66	.95		
	Low	84	4.70	.85		
Addiction Symptoms	High	181	2.62	.81	1.32	.27
	Middle	583	2.56	.69		
	Low	84	2.47	.69		
The Average Score	High	181	2.71	.49	.36	.70
	Middle	583	2.69	.44		
	Low	84	2.66	.49		

Note: M=means, SD=Std. Deviation

The results of one-way ANOVA in table 14 indicate that there were significant differences in the following Smartphone addiction indicators: Calls received and messages sent among SQU undergraduates related to their academic achievement. Hence, Post Hoc testing, using the Scheffe test, was conducted for multiple comparisons (Table 15).

Table 15 : Results of Post Hoc tests for Smartphone addiction among SQU undergraduates related to their academic achievement

Smartphone Addiction Indicators	(I) GPA	(J) GPA	Mean Difference (I-J)	P	Post Hoc
Calls Received	High	Middle	0.33**	0.01	High>middle
		Low	0.28	0.12	
	Middle	Low	-0.05	0.92	
Messages Sent	High	Middle	-0.33**	0.01	middle > High
		Low	-0.37**	0.02	Low > High
	Middle	Low	-0.05	0.93	

The results of Post Hoc tests in table 15 reveal that there were significant differences in calls received among SQU undergraduates, in favor of higher-grade students more than among middle and low-grade students. Moreover, there were significant differences in messages sent among SQU undergraduates, in favor of low and middle-grade students more than among higher-grade students.

Discussion

1. Smartphone usage among SQU undergraduates

The current results showed that sending messages, especially via WhatsApp, was the most used Smartphone activity among SQU undergraduates, while voting for television programs and competitions were the least used Smartphone activity. This relates to the fact that messages can be composed and sent in a short time, from virtually anywhere. University students prefer WhatsApp messages because the service is quick, free and convenient. They also use text messaging to coordinate with both friends and family. Interestingly, the focus group discussion results supported these explanations and highlighted the five following specific reasons regarding why SQU undergraduates heavily use WhatsApp messenger:

The simplicity of WhatsApp messenger use, its free of charge, the numerous positive uses, the program's good features, such as group chatting, sending photos, video, location, and contacts. Finally, the possibility of broadcasting WhatsApp messages to various contacts. Moreover, this finding tends to support Lecturer et al.'s (2014)

observation that university students were addicted to WhatsApp messenger usage.

2. The type of Smartphone usage behavior among SQU undergraduates

The results of the current study showed that voluntary behavior was the most common Smartphone usage behavior among SQU undergraduates, followed by dependent behavior and mandatory behavior, while compulsive behavior was the least common type of Smartphone usage behavior among SQU undergraduates. In specific terms, Smartphone usage among SQU undergraduates could be regarded more as voluntary, dependent or mandatory behavior rather than habitual, addictive or compulsive. This phenomenon could possibly relate to the fact that SQU undergraduates were voluntarily engaged in Smartphone use for seeking information and entertainment -as the present study results revealed previously. Another contributory reason might be that many SQU undergraduates do not study in their hometown, so they seek to establish new contacts and social relationships. Thus, it is a conscious decision to use their Smartphone to acquire positive results. It suits their lifestyle and core values.

As mentioned in the literature review, there is little previous research on the topic of types of Smartphone usage behavior. Hence, the current study provides rich new information regarding the types of Smartphone usage behavior among SQU undergraduates. Nevertheless, the current finding differs from the Shambare et al. (2012) result that suggests that mobile phone usage is dependent, habitual and addictive. Likewise, the current finding differs from that reached by Lin, Chang, Lee, Tseng, Kuo, and Chen (2014) which revealed that Smartphone compulsive behavior has been regarded as the core of addiction.

3. Smartphones gratifications and addiction Genes among SQU undergraduates

The current findings indicated that seeking information and entertainment was the most common Smartphone gratification among SQU undergraduates, which relates to the fact that SQU undergraduates had a strong need to acquire information for learning and entertaining purposes. Besides, SQU undergraduates from different fields of study need information to write their term papers, assignments, and update their knowledge. Therefore, they found that Smartphones were very useful tools for seeking information and sharing it with friends and classmates.

Although there is little previous research on this topic, the present study finding tends to agree with results obtained by other studies regarding mobile phone gratifications (e. g. Grellhesl, & Punyanunt-Carter, 2012). These studies indicated that seeking information and entertainment, and social interaction were the most common mobile phone gratifications among university students.

4. Smartphone addiction levels among SQU undergraduates

The current results regarding Smartphone addiction levels among SQU undergraduates revealed that the moderate level of Smartphone addiction was the most prevalent, followed by the heavy level and finally the casual level.

This result showed that the majority of students were not frequently involved in heavy addiction. However, the (33%) of heavy addiction among these SQU students represents a high percentage. This result can be explained by the fact that Smartphones increase students' social communication and expand their opportunities to establish social relationships. Furthermore, Smartphones are equipped with various features that facilitate communication and entertainment for their users. Another reason is the availability of Smartphone's devices. However, the focus group results regarding Smartphone addiction reasons among SQU undergraduates specified two types of reasons: reasons related to student and reasons related to Smartphone manufacturers. First, the reasons related to students were as follows: escape from academic pressure; negative self-expression ; over dependence on Smartphone to accomplish academic work; the negative desire for excellence by experiencing new devices and apps before others; addicted chatting via SNs. These reasons reflected the psychological needs of Smartphone addicts. Additionally, other reasons related to Smartphone manufacturers who make people addicted to Smartphone use through continuous upgrading of Smartphone devices and attracting young customers by developing new applications. Consequently, this study suggests that the transition from casual to moderate or heavy Smartphone addiction occurs when the user views the usage as an important mechanism to release academic pressure, relieve stress and anxiety.

Comparing to previous studies, the percentage of students with heavy Smartphone addiction is slightly similar to that obtained by Tavakolizadeh et al. (2014), who reported (36.7%) of mobile phone addicted students.

5. The relationship between Smartphone usage, gratifications, and addiction among SQU undergraduates

There is some controversy in research on the relation between Smartphone addiction, types of usage, and gratifications. However, the current study results found significant relationships between Smartphone addiction and three types of Smartphone usage behavior: Addictive, compulsive and habitual, whereas no significant differences were observed between Smartphone addiction and dependent, voluntary and mandatory usage behavior. In other words, it seems that there were significant relationships between Smartphone addiction and negative types of Smartphone usage behavior.

Furthermore, the focus group discussions confirmed the above explanation and provided other evidence regarding the existence of relationships between Smartphone addiction and addictive, compulsive, and habitual usage behavior. First, Smartphone addiction usually leads to negative usage behavior. Second, use of Smartphone as habit turns into addiction with time. Third, addiction is usually linked to passive types of Smartphone usage behavior. Finally, Smartphone addicts lose control of their Smartphone use.

The focus group discussions confirmed previous explanations and added other explanations as follows:

- 1) Addicts need to use their Smartphones for self-expression;
- 2) Addicts try to satisfy their psychological needs through their Smartphones;
- 3) Addicts seek compatibility with friends through use of social networking programs;
- 4) Absence of the family's role in satisfying the addict's psychological needs, and
- 5) Addicts feel shame and social phobia.

Furthermore, the present results identified significant relationships between all types of Smartphone usage behavior and Smartphone gratifications among SQU undergraduates, except in the cases of dependent behavior and self-identity and conforming. In addition, this study identified no relationship between habitual behavior and information seeking and entertainment.

A potential explanation for this result is that SQU undergraduates displayed the various types of Smartphone usage behavior to gratify the

same motives, except for students who displayed dependent usage behavior, because they were not following self-identity and conforming motives. The explanation could be that self-identity and conforming motives appear more with independent usage behavior.

6. The differences in Smartphone usage, gratifications, and addiction among SQU undergraduates related to academic achievement

According to student's academic achievement there were significant differences in Smartphone addiction, while there were no significant differences in terms of Smartphone usage and gratifications between SQU undergraduates. Specifically, the current study results revealed that low-academic achievement students were addicted to sending messages, while high-academic achievement students received more calls than other groups. This difference may be attributable to three main reasons. First, it seems that low-academic achievement students waste their precious time by keeping themselves busy with writing and sending useless messages in a way that leads to poor academic achievement. Secondly, this also may be because low-academic students lack time management skills and the ability to balance between personal and practical lives. As a result, they tend to use their Smartphone extendedly, which affects their academic performance. Thirdly, Smartphone addicts grow tolerant of Smartphone use and become very anxious and irritated when the phone is not available, despite the fact that their addiction may cause many academic problems, which leads to a decrease in their academic achievement level. According to Kim (2013), young Smartphone users with poor academic achievement usually receive less respect from surrounding people. Besides, poor academic achievement might be associated with low self-esteem and other behavioral problems, such as sleep disorders, aggression or depression. Those kinds of feelings and isolation would cause these users to go online in a search for feelings of belonging and self-satisfaction.

Conclusion

This study considered novel and noteworthy phenomena: Smartphone usage, gratifications and addiction. Little research has cast light on these issues, despite the increasing negative influence of this addiction on university students. Therefore, the present study explored the relationship between Smartphone usage, gratifications, and addiction and their relationship with academic achievement, sought to address an important research gap. It identified three levels of addiction, based on

addiction indications, and confirmed distinctive traits of these levels. Finally, the present results were expected to contribute to expanding the behavioral addiction research field and to facilitate further research into its clinical implications.

It is clear from the study results that Smartphones provide great features and capabilities for their users. However, when we look at this technology from a different perspective, it becomes apparent that Smartphones have both positive and negative impacts. There are several ways that we can control and minimize the negative impacts of Smartphone in society. Smartphone can certainly be smart if the vendors, society and technologists understand their responsibility towards Smartphone usage in terms of increasing the benefits for business, education, health and social life. It is apparent that the benefits of Smartphone are tremendous and negative impacts are minor. Therefore, it is important to concentrate on how to prevent the misuse of Smartphones rather than preventing their use. Policies and strict compliance procedures need putting in place at workplaces and at universities to ensure the proper use of Smartphones. Such provisions will enable users to use their phones if this is required and when the use is important.

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