

Smartphone Addiction Reasons and Solutions from the Perspective of Sultan Qaboos University Undergraduates: A Qualitative Study

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Abstract

This study attempted to sketch out the diverse addiction reasons and solutions among Sultan Qaboos University undergraduates. The data were collected through focus group discussions in which 16 SQU undergraduates participated voluntarily. Thematic data analysis was conducted to draw out qualitative data. The results revealed two main reasons behind students' Smartphone addiction related to students themselves and to Smartphone manufacturers. The results also suggested three main solutions for the problem of Smartphone addiction related to the students themselves, the university and the families.

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Introduction

Although Smartphone use has been increasing in all economic and age sectors, university students are considered as one of the most important target markets and the largest consumer group of Smartphone services [1,2] emphasized harmful and contentious aspects of excessive Smartphone use among these category of users, such as emotional stress, financial costs, falling literacy and damaged relationships. Moreover, overuse reduces students' concentration during class and hence affects their academic achievement and causes addiction. Smartphone usage is so strongly integrated into young users' behaviour that symptoms of behavioural addiction, such as interrupting their day-to-day activities [3]. To these days, SNSs such as Face book and WhatsApp can be easily accessed by not only default Internet browsers on smartphones but also some free smartphone applications of SNSs. Results of several studies have suggested that smartphone addiction has negative effects on mental health and well-being [4].

The American Society of Addiction Medicine [5] defines "Addiction" as a primary, chronic disease of brain reward, motivation, memory and related circuitry. Dysfunction in these circuits leads to characteristic biological, psychological, social, and spiritual manifestations. Such dysfunction is reflected in an individual pathologically pursuing reward and/or relief by substance use and other behavior. However, Smartphone addiction is a type of behavioral addiction that can also be destructive to social life beyond the Smartphone devices. Although not officially considered as a type of addiction, it is now prevalent worldwide, causing trauma and anxiety, among other symptoms.

So far, there is no consensus among existing studies regarding the definition of Smartphone addiction because of: a) the variety of addiction symptoms that are associated with Smartphone use; b) the wide variety of new Smartphone functions; and c) the different problematic outcomes associated with Smartphone addiction [6]. However, by contrast with material-related addictions, Smartphone addiction may not produce observable signs or symptoms, such as physiological indications of craving and the addicted individual may appear to be working in a normal and socially acceptable manner [7,8].

According to Casey [9], previous studies articulated three characteristics for mobile phone addiction among university students.

First, they always keep their mobile phones switched on. Second, they use their phones even when they have a landline phone. Finally, they encounter financial and social difficulties because of their excessive use. However, as the functions of the Smartphone become more and more diverse, university students are becoming increasingly dependent on or addicted to this device, not only for mediated interpersonal communication, but also as a tool for other functions. In his study, Casey [9] identified five symptoms of Smartphone addiction: disregard of harmful consequences, preoccupation, and inability to control craving, productivity loss, and feeling anxious and lost.

Thus, a focus group discussion was used to gain insight into students' attitudes and perspectives regarding the reasons behind Smartphone addiction and how to overcome it. Specifically, the intention was to gather information from SQU undergraduates concerning the following outcomes:

- To understand the reasons behind Smartphone addiction among SQU undergraduates
- To find solutions to the problem of Smartphone addiction among SQU undergraduates at level of students, families and the university.

Research Problem

Because the researchers had the opportunity to teach courses at SQU, they were able to observe the strong relation with and heavy use of Smart phones among SQU undergraduates. These students used their devices when they were walking around, during classes and even when they were eating in the cafeteria. For many reasons SQU students can develop Smartphone addiction. First, Smart phones have functions that enable students to avoid communicating with others face-to-face

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or instantly, but at the same time enhance their membership in the virtual social group. Second, other functions of Smart phones allow students to enjoy various kinds of entertainment, such as games, which help them to escape from uncomfortable situations. Third, they can also get information they need while surfing on the Internet via Smart phones. As a result, it seems that many students are tending to rely more and more on their Smart phones, which will lead to heavier usage and eventually into addiction.

Hence, it is essential to recognize students who are at risk of Smartphone addiction. Although the risk factors that create addiction remain unknown [10]. According to Fix et al. [11], Smartphone addicts with dysphoric moods may find relief online from their symptoms of loneliness, boredom, anxiety, depression, stress, or lack of life satisfaction. Online relationships may substitute for social relationships in person. Addicts with low self-esteem may find that face-to-face inhibitions do not occur online, and they may want to interact with individuals without getting physically or emotionally hurt. Those individuals are trying to escape from the sometimes-harsh realities of life.

Wu, et al. [12] identified three psychological risk factors of Smartphone addiction and SNS addiction among young Chinese users. Their findings revealed that those who spent more time on SNS reported higher addictive tendencies, which correlated positively with both outcome expectancies and impulsivity, but negatively associated with Internet self-efficacy. These three risk factors consisted of two cognitive attributes and one personality attribute that could heighten one's vulnerability to problematic SNS use.

Although many researches highlighted the problem of Smartphone addiction very few studies discussed the reasons and solutions to this problem. AlBarashdi [13] examined Smartphone usage, gratifications, and addiction among Sultan Qaboos University undergraduates applying a mixed-approach investigation. She found that the prevalent rate of heavily addicted SQU undergraduates was 33.1%. Her findings also revealed that "Disregard of harmful consequences" was the most frequent addiction symptom among them. WhatsApp and text message services were the heaviest applications used by SQU undergraduates. Thus, the present study aimed to answer the following research questions from the perspective of SQU undergraduates:

- What are the reasons behind Smartphone addiction among SQU undergraduates?
- What is the most common symptom of Smartphone addiction among SQU undergraduates, and why?
- What is the heaviest Smartphone's application use among SQU undergraduates which may cause Smartphone addiction, and why?
- What solutions can be adopted to prevent Smartphone addiction among SQU undergraduates?

Literature Review

Reasons behind Smartphone addiction among university students

Generally people who have psychological and emotional issues such as depression, loneliness, social anxiety, impulsivity, and distraction easily get addicted to technology such as the Smartphone. In addition, the place where Internet accesses, the degree of time use, peer relationships and parenting types are also relevant. Smartphone addiction is also associated with the physical and psychological

problems such as dry eyes, carpal tunnel syndrome, repetitive motion injuries, wrist, neck, back and shoulder pain, migraine headaches and numbness and pain in the thumb, index and middle fingers [14].

According to bio-psychosocial frameworks, in terms of the etiology of addictions [16] and the syndrome model of addiction [16], Smartphone addiction shares a common underlying etiological framework with other substance-related and behavioral addictions. Current developments in theoretical approaches have largely embraced bio-psychosocial models of addiction, which attribute these behaviors to a complex interaction of factors, including genetics and neurobiological mechanisms, personality traits, coping styles, and social environment. Consequently, a combination of biological, psychological, and social factors contributes to the etiology of addictions, which may also hold true for Smartphone addiction [17].

On the one hand, the transition from normal to problematic Smartphone use occurs when the user views usage as an important mechanism to relieve stress, loneliness, or depression. Those who repeatedly engage in this type of addicting are usually poor at socializing in real life. Smartphone use provides such people with continuous rewards, such as self-efficacy and satisfaction. Finally, they end up engaging in the activity more and more, leading to many problems, such as ignoring real-life relationships and work or learning conflicts. These problems may then worsen the user's undesirable moods and lead to even more engagement in Smartphone use as a way of relieving dysphonic mood states. When Smartphone users repeat this cyclical pattern of relieving undesirable moods, the level of psychological dependency on usage increases [18].

In addition, addiction does not necessarily occur immediately, but can develop through habit; habit can become maladaptive and lead to the development of an addiction. Smartphone addiction can develop through intense focus on the Smartphone or a specific application in a way that negatively interferes with a person's life; for example, checking, posting, or interacting on social media platforms. If the Smartphone or application is removed from the addicted person, panic attacks or feelings of discomfort emerge [11]. Likewise, according to Oulasvirta, Rattenbury, Ma, et al. [18], Smart phones cause negative checking habits. Checking habits are automatic actions whereby the Smartphone is unlocked to check the start screen for new messages, notifications, alerts, and application icons. These habits can be triggered by an external (ringtone) and internal cues (emotional state) and can be maladaptive and interfere with people's lives. Checking for information can be rewarding, if someone has a new message or notification, hence the so-called new information reward. Thus, rewards can enforce repeated action [19].

Symptoms of Smartphone addiction among university students

Despite the fact that the Smartphone is an extremely useful tool and simplifies the performance of abundant social and personal functions, addiction to it can give rise to problems in interactions with others. In addition, it can interfere with other activities in daily life, alter the rules for interpersonal relationships, affect the user's health or well-being, and can even affect students' academic achievement. Walsh, et al. [20] found that mobile phone addicted participants reported feeling frustrated, angry and concerned at times when they were unable to use their phones. However, the most common symptom reported was withdrawal, particularly feeling lost.

However, according to Diane [21], Smartphone addiction disorder appears as physical as well as psychological signs and symptoms.

Individuals who are addicted do little physical activity and generally disregard their health, whilst negative physical signs such as carpal tunnel syndrome, poor posture, backaches, migraine headache, poor personal hygiene, irregular eating, sleep deprivation, eyestrain, dry eyes, and lack of sleep can affect their immune functioning and hormone secretion patterns and their cardiovascular and digestive patterns.

Moreover, Smartphone addiction has produced the terms crackberry and Blackberry thumb, the latter term referring to a repetitive strain injury caused by typing with the thumb on a handheld device [22]. According to the APA Diagnostic Classification DSM-IV-TR [23], the common symptoms of behavioral addiction are similar to those of other types of addiction. These symptoms include:

- Tolerance building: more and more is needed to fulfill a person's needs
- Withdrawal: when a substance or action cannot be performed, anxiety or unpleasant feelings arise
- Loss of control: behavior is not under control anymore.
- Preoccupation with the addiction: other activities, such as recreation, social activities, and work are planned around the addiction.
- Time planning, and recovering from the addiction is controlling life.

However, not every addict will display all these symptoms or signs, as they could differ from person to person [11].

The Diagnostic and Statistical Manual of Mental Disorders DSM-IV recognizes gambling but not internet or media use as potential addictions. Recent theories suggest that Internet and media 'addiction' are rather a struggle to maintain effective self-regulation over problematic habit-driven behavior. In other words, addiction and habits are parts of the same continuum [24]

Smartphone addiction is in many aspects similar to Internet addiction, and as such any attempt to develop Smartphone addiction criteria must also consider Internet addiction criteria. However, although rapid developments in the IT industry and a corresponding rise in usage have created the various negative consequences of Smartphone addiction, there has been little research discussion of this topic. Therefore, there is an urgent need to develop a diagnostic scale for Smartphone addiction [25].

In Korea, the National Information Society Agency has developed a Smartphone Addiction Proneness Scale. This project assessed each subject group and then, based on their addiction proneness, divided the subjects into three groups: high-risk, low- to medium-risk, and a general group [26]. However, the project provided only a very rudimentary assessment, differentiating between dependence and abuse, based on a psychiatric diagnosis.

According to Valderrama [22], the greatest challenge in diagnostic Smartphone addiction may be a lack of agreement regarding the validity of technological addictions as legitimate forms of clinically pathological addictive behavior. Without official recognition as a disorder in the latest iteration of the DSM, it will be difficult to achieve consensus regarding the specific criteria for diagnosis. Most studies on Smartphone addiction seem to focus either on quantitative indicators of addiction, such as the amount of time allocated to Smartphone use

by counting calls sent, calls received, messages sent, and messages received, or on qualitative indicators, by counting the frequency of appearance of Smartphone addiction symptoms, whereas both are needed.

Smartphone popular applications among university students

Smartphone addiction varies according to the functions and applications to which the person is addicted. Some recent studies have focused on addiction to particular Smartphone functions and applications, such as addiction to text-messaging [27,28], addiction to SNS via Smartphone [29,30], and addiction to WhatsApp [31]

According to Jafarkarimi, et al. [32] Face book has become the most popular social networking site with more than 2.2 billion users. The pleasure that Face book has brought has led to some addictive behavior among its users. They employed the Bergen Face book Addiction Scale to investigate Face book addiction using a sample of 441 students in Universiti Teknologi Malaysia. Results showed that 47% of the participants were addicted to Face book.

However according to Przepiorka et al. [33] the number of Face book users is increasing, so it is worth investigating the role of time perspective in maladaptive types of usage. They examined the potential relationship of time perspective with Internet addiction and Face book intrusion. They analyzed similar associations between time perspective and the two types of addiction. Age and daily time spent online were predictors of Internet addiction, Face book intensity, and Face book intrusion. Past Negative and Present Fatalistic orientations were positive predictors for both types of addiction, whereas Future time perspective was a negative predictor.

Likewise, WhatsApp has become very popular application among young users. WhatsApp Messenger is a 'cross-platform messaging app which allows users to exchange messages without having to pay for SMS' (WhatsApp.com, 2012). The application is compatible with iPhone, BlackBerry, Android, Nokia, and other Windows Smartphones. WhatsApp features include one-on-one chat facilities, group chat, push notifications and sending and receiving both video and audio files. By April 2014 it was estimated that WhatsApp had approximately 500 million users [34], who send and receive more than 64 billion messages a day [35].

In Oman although numerous social apps (e.g., Face book and Twitter) have been introduced, very few have been as widely received as WhatsApp. There were 1 million users of WhatsApp in Oman at the end of 2014. Half of Oman's phone users subscribe to data packages, and most of these are using WhatsApp. It is not just teenagers who love it, however: business people find it useful to keep tabs on what's happening, share information and root out leads. During storms and rain that recently swept through Oman, for instance, photographs and videos of flooded wadis and rain soaked streets were quickly circulating on WhatsApp, uploaded by people on the ground and viewed almost instantaneously [36].

There are two clear advantages of WhatsApp. First, the service is free. Second, subscribers can send an unlimited number of instant messages of unlimited size. Whereas in the case of ordinary SMSs, subscribers are billed in 160-character intervals, and thus a 161-character SMS is billed as two SMSs, WhatsApp subscribers do not experience such

restrictions [37]. Thus, to many consumers, particularly students, WhatsApp has a multiplicity of relative advantages over SMSs. To access BBM services, Blackberry subscribers pay (US\$5.501) monthly fee, which is not the case with WhatsApp, whose annual subscription is only US\$0.99 [37].

Shambare [38] investigated the adoption and diffusion patterns of WhatsApp application among South African youths. This study modeled the factors influencing the adoption of WhatsApp applying a questionnaire developed from the Technology Acceptance Model. Structural equation modeling tested the proposed theoretical model. Results suggest that a combination of cost efficiency, simplicity, user-friendly features, and the ability to run on multiple platforms influences and promotes users' attitudes and behavioral intentions to adopt WhatsApp.

Smartphone addiction solutions and treatment

There is no doubt 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.

However, smartphone addiction can be treated. The addicted students and their parents should take the significant role to overcome the addiction problem. According to Kim [14], Smartphone addiction treatment should focus on changing addicts' personal feelings and thoughts. He suggested the following three approaches to treat addicts:

Cognitive behavioral approach

This approach focuses on making Smartphone addicts their own therapists. Changing addicts' behavior over time comprises five stages: pre-contemplation, contemplation, preparation, maintenance and termination. In the pre-contemplation stage, the therapist focuses on breaking the individual's denial of a serious problem with Smartphone addiction. In the contemplation stage, the individual recognizes the need for change, but the desire to change may not be substantial and feelings of being overwhelmed may exist. In the preparation stage, the individual is ready to establish a plan to address the problem. The maintenance state begins when the individual feels he or she has control over their Smartphone use and is putting less energy into the behavioral change. The final stage, termination, has the goal of preventing relapse.

Motivational interviewing

This approach is a brief, patient-centered, directive approach that emphasizes personal choice and responsibility. Motivational interviewing is the greatest challenge facing substance use disorders treatment agencies. For example, people who are addicted to

Smartphone use usually deny the problem and do not seek rehabilitation.

Mindfulness behavioral cognitive treatment

Smartphone addicts are believed to act automatically or 'mindlessly' with little real awareness of the cues that trigger substance misuse. The idea of promoting mindfulness could thus prove important in tackling addictions. Mindfulness-based relapse prevention (MBRP) is another name for MBCT. Psychoeducational intervention combines traditional cognitive-behavioral relapse prevention strategies with meditation training and mindful movement. The primary goal of this approach is to help Smartphone addicts tolerate uncomfortable states, like craving and experiencing difficult emotions. Mindful movement includes light stretching and other basic gentle movement. Mindfulness oriented recovery enhancement (MORE) is adapted from the MBCT depression treatment manual.

Method

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 research questions.

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 discussion sessions took place, at locations convenient to the students. Two sessions were conducted for each 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). The following are the characteristics of the 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 highly-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 mothers were low-educated, five mothers were middle-educated, and only two mothers were highly-educated.
- Ten of the sixteen students were middle-grade students, and six students were higher-grade.

- Thematic data analysis was conducted to draw out qualitative data about SQU undergraduates' attitudes and perspectives regarding Smartphone addiction and how to overcome the problem. Discussions were audio-recorded and transcribed by the researcher, and then the emerging concepts were noted. Common concepts that emerged from the group discussions guided the subsequent thematic data analysis. Thematic analysis entailed a process of coding in six phases to create established and meaningful patterns. These phases consisted of familiarization with data, generating initial codes, searching for themes among codes, reviewing themes, defining and naming themes, and producing the final report.

Then coding process, will carried out using ATLAS.ti 7 software for qualitative data analysis

Results

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 and escape from academic pressure; (2) Using Smartphones in self-expression, especially through SNSs; (3) Depending on certain Smartphone functions and Apps to accomplish their academic work; (4) The desire for excellence through experiencing new devices and apps before others; and (5) Chatting via SNSs 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)

"Some SQU undergraduates become addicted to Smartphone usage because they enable 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". (P6)

"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". (P2)

"Another reason behind the high percentage of addicted 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 performance". (P12)

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 rates 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)

Figure 1 summarizes the focus group participants' perspectives regarding the reasons behind Smartphone addiction.

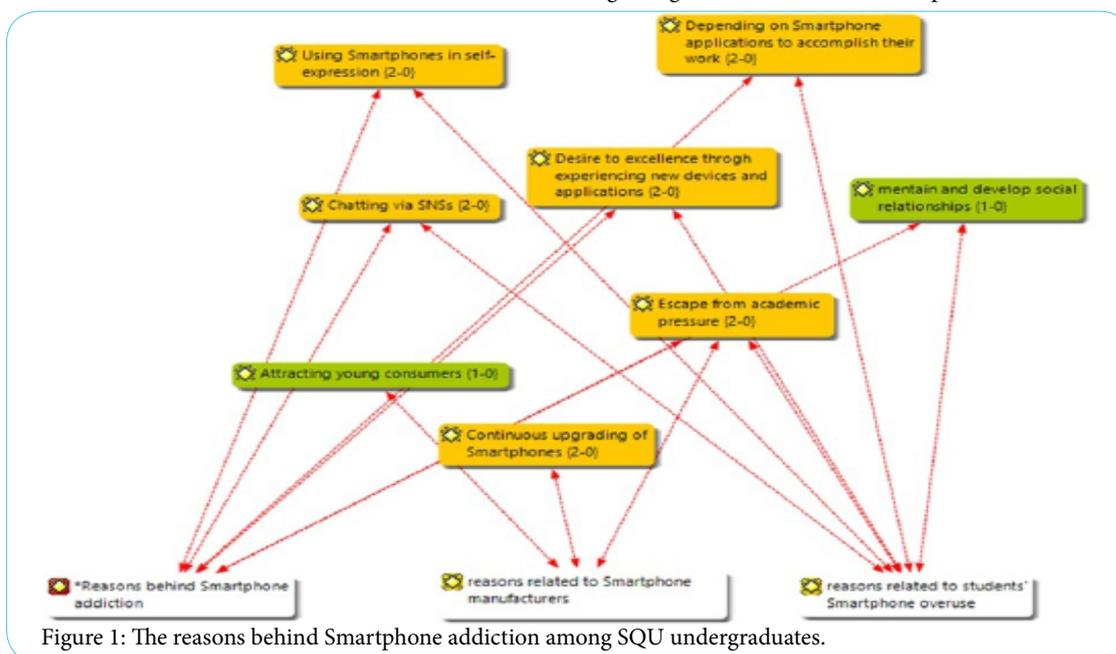


Figure 1: The reasons behind Smartphone addiction among SQU undergraduates.

The most common symptom of Smartphone addiction among SQU undergraduates

The majority of research participants specified that ignoring the harmful consequences of Smartphone overuse was the main prevalent Smartphone addiction symptoms among SQU undergraduates. They presented five main reasons behind the ignoring of the harmful consequences of the Smartphone use among SQU undergraduates. Four reasons related to students' awareness, whereas one reason related to the community's awareness role. The reasons that related to students included: 1) Focusing on the benefits of Smartphone use more than on the negative consequences; 2) Preoccupation with Smartphone use; 3) Denial of the health evidence on Smartphone addiction; and 4) No possibility to stop using the Smartphone. In sequence, the following comments illustrate each reason:

"I think that the main reason behind ignoring the harmful consequences of Smartphone overuse among SQU undergraduates is because those students were focusing on the benefits of Smartphone use more than the negative consequences" (P1)

"From my point of view, I think these students were preoccupied with Smartphone use to the degree that they did not care about the harmful consequences of their heavy usage" (P5)

"I don't think SQU undergraduates lack awareness about the harmful consequences of Smartphone's heavy usage; however, they simply deny the medical evidence regarding the health risks of Smartphone heavy usage in order to continue using their devices" (P 10)

"In my opinion, although these students knew the harmful consequences of Smartphone use, there is no possibility to stop using their devices because they have become necessary tools in our daily life" (P2)

In addition, one of the participants added another reason related to the community's awareness role, namely, the absence of public sensitization programs about the harmful effects of Smartphone heavy usage on health, money, time, and social relationships. He reported:

"Besides, the community must play an important role to prevent Smartphone addiction through providing awareness programs to sensitize the public regarding the drawbacks of heavy Smartphone use for their health, money, time, and social relationships" (P 10)

Figure (2) summarizes the focus group participants' opinions about the reasons behind ignoring the harmful consequences of Smartphone use among SQU undergraduates.

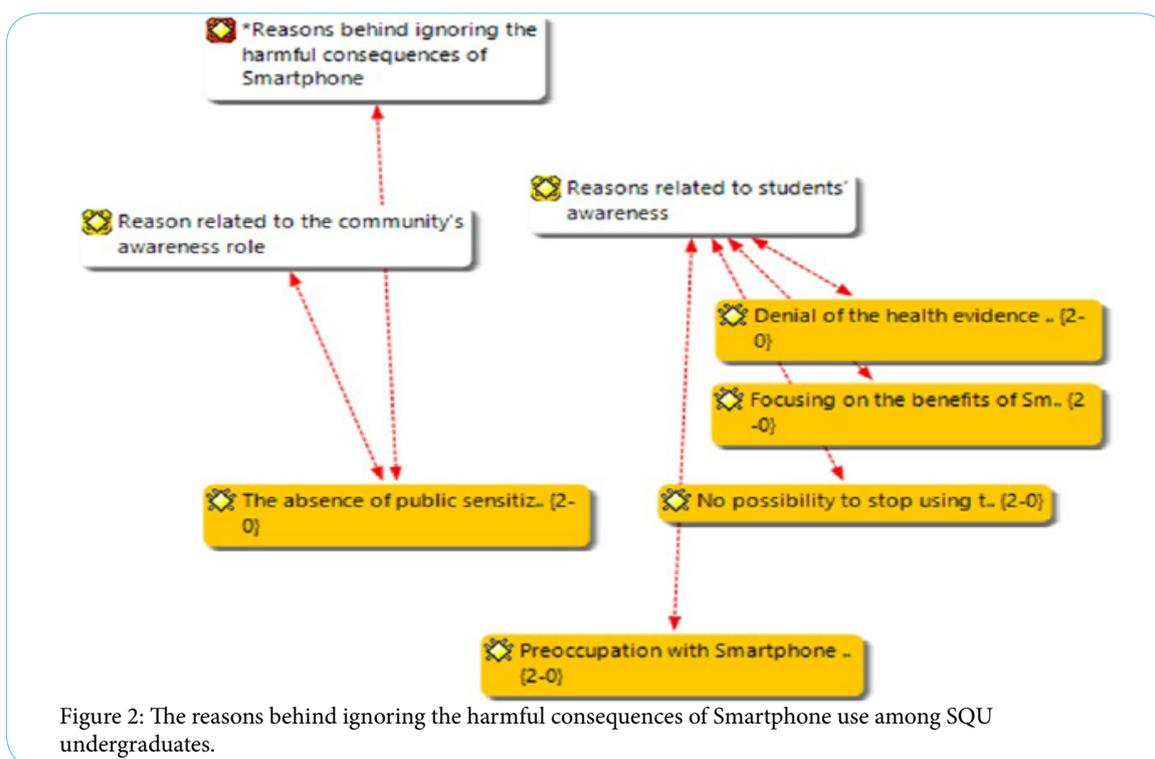
The heaviest Smartphone's application use among SQU undergraduates

The majority of focus group participants indicated that WhatsApp heaviest usage among SQU undergraduates. They highlighted five main reasons to exemplify why they choose to use the WhatsApp messenger. These reasons included: 1) The simplicity of use; 2) The low cost; 3) It's multiple positive uses; 4) The program's good features, such as group chatting, sending photos, video, location, and contacts; and 5) The possibility of sending WhatsApp messages to many contacts. In sequence, the following comments illustrate each of these reasons:

"One reason behind WhatsApp heaviest usage among SQU undergraduates is its ease of use. This application enables you to send messages anywhere and anytime. Also you can check if the receiver has read it" (P 6)

"I think nowadays nobody still uses SMS because WhatsApp messages are almost free, and even if you send SMS the receiver will reply through WhatsApp messages" (P 9)

"For SQU undergraduates, WhatsApp has become necessary in any Smartphone device. The wide spread of WhatsApp use among SQU undergraduates is related to many reasons. Firstly, they use it to keep in touch with their family, friends, colleagues, and teachers. In



addition, it is a useful tool in sharing information, photos and audios. A more important thing is that it keeps them updated with all the news surrounding them. It also reflects the person's status". (P 13)

"It has many features, for example, through WhatsApp you can send much more than just text. You can send video, audio, photo, location and contacts. You can also chat within a group of people" (P 16)

"Also you can broadcast WhatsApp messages to your contacts very quickly and easily" (P 16)

Figure (3) summarizes the focus group participants' attitudes toward the reasons behind WhatsApp addiction among SQU undergraduates.

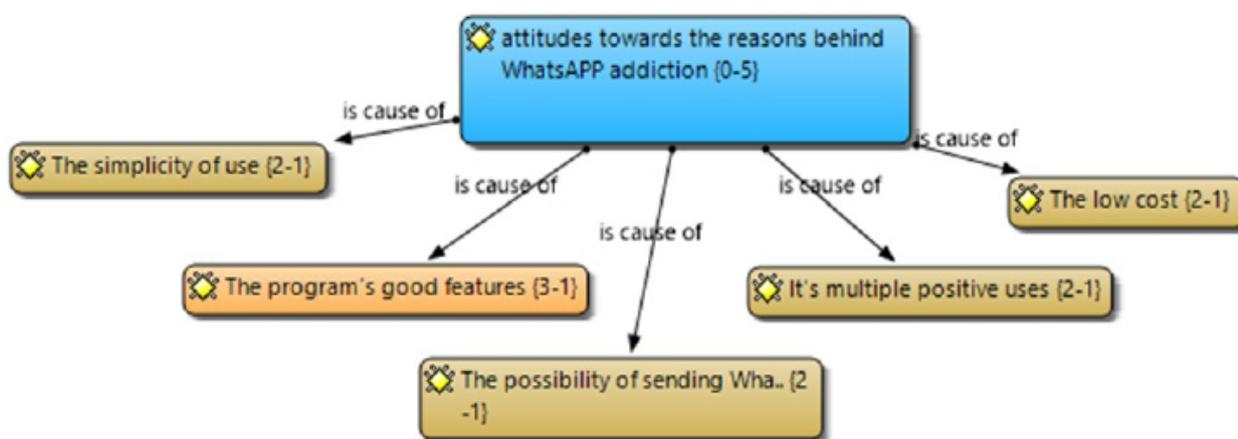


Figure 3: The reasons behind WhatsApp addiction among SQU undergraduates.

Solutions for the problem of Smartphone addiction among SQU undergraduates

The researcher discussed with the focus group participants the solutions that students can adopt to get rid of the problem of Smartphone addiction, and the focus group participants as a whole provided the following six suggestions:

Delete the programs that cause addiction. One of the participants stated: "In my opinion, one solution that students can follow to get rid of the problem of Smartphone addiction is to delete the programs that cause addiction, such as WhatsApp or Face book or the SNS programs" (P 1)

Performance of positive self-fulfilling activities and increased social networking. One of the participants stated: "I think they can solve Smartphone addiction by doing some positive self-fulfilling activities and increasing their social networking" (P12)

Ask a friend for help. One of the participants stated: "In my opinion I think they need somebody to help them get rid of the problem of Smartphone addiction, such as a friend or a colleague, because they cannot solve the problem by themselves" (P 6)

Ask specialists for treatment of Smartphone addiction. One of the participants stated: "...I believe they should ask specialists for treatment of Smartphone addiction"

Find alternatives to using the Smartphone as an entertainment tool. One of the participants stated: "From my view one of the most important solutions to get rid of the problem of Smartphone addiction

is to find alternatives to using the Smartphone as an entertainment tool. For example, they should experience real social interaction with friends and family members" (P8)

Gradually reduction of their Smartphone use. One of the participants stated: "I think they can get rid of the problem of Smartphone addiction by reducing their use of Smartphone gradually" (P 16)

Then, the researcher discussed with focus group participants potential solutions that the community can adopt to prevent the problem. The participants as a whole provided the following four suggestions for SQU administration to reduce Smartphone addiction among students:

Disconnect the Internet network inside the classroom. One of the participants stated: "In my opinion, one solution that SQU can follow to reduce the negative effects of the Smartphone addiction problem is to disconnect the Internet network inside the classrooms" (P 1)

Increase recreational programs and encourage social networking among undergraduates. One of the participants stated: "SQU can also reduce the negative effects of Smartphone addiction by increasing recreational programs and encouraging social networking among SQU undergraduates" (P 14)

Enhance students' awareness regarding Smartphone addiction through outreach programs. One of the participants reported: "I believe that SQU should reduce the negative effects of the problem of Smartphone addiction by enhancing awareness through outreach programs regarding Smartphone addiction" (P8)

Provide counseling and treatment programs for Smartphone addiction. One participant stated: "I think SQU should employ specialists to provide counseling and treating programs for Smartphone addiction" (P5)

Moreover, the focus group participants as a whole presented five main suggestions that families can follow in order to reduce and prevent Smartphone addiction among their children, as follows:

Inform children regarding the risks of Smartphone addiction for their health, friendships and academic achievement, using effective educational guidance, which they should convince their children to follow. One participant reported: "In my opinion, one of the solutions

that the family can follow to reduce the negative effects of the problem of Smartphone addiction is to educate their children about the risks of Smartphone addiction” (P 1)

Increase provision of recreational programs, which have an effective role in occupying children and preventing negative Smartphone usage. One of the participants stated: *“The family can also increase positive recreational programs like travelling and visiting family members, which will deter their children from addictive or negative Smartphone use”* (P6)

Increase social interaction within and outside the family by increasing family meetings and encouraging of children to sustain their social relationships. One participant reported: *“I think it is important for the family to increase direct social interaction within and outside the family”* (P 10)

Maintain a balance between control and confidence in dealing with children’s Smartphone use. One participant stated: *“I believe the parents should maintain a balance between control and confidence in dealing with their children”* (P12)

Set a limit for children’s Smartphone bills. One participant reported: *“In my opinion one solution that the family can follow to reduce the negative effects of the problem of Smartphone addiction is to put a limit on their children’s Smartphone bill”* (P 8).

extensively for entertainment and escaping from academic pressure; using Smartphones for self-expression, especially through SNs; dependence on certain Smartphone functions and Apps to accomplish academic work; the desire for excellence by experiencing new devices and apps before others; and chatting via SNs to maintain and develop social relationships. Additionally, other reasons related to Smartphone manufacturers: continuous upgrading of Smartphone devices and attracting young customers by developing new applications. Compared to previous studies, these reasons are fairly similar to those obtained by others such as Tavakolizadeh, et al. [39] Karami et al. [40] and Perry [41].

The most common symptom of Smartphone addiction among SQU undergraduates

Disregard the harmful consequences was the most common symptom of Smartphone addiction among SQU undergraduates .The focus group discussions provided some explanations regarding why SQU undergraduates disregard the harmful consequences of Smartphone addiction. The reasons included the following: students focus on the benefits of the Smartphone more than in the negative consequences; they are overwhelmed by their Smartphone use; they deny the evidence about harmful health consequences and have no possibility of stopping use their Smartphone. An

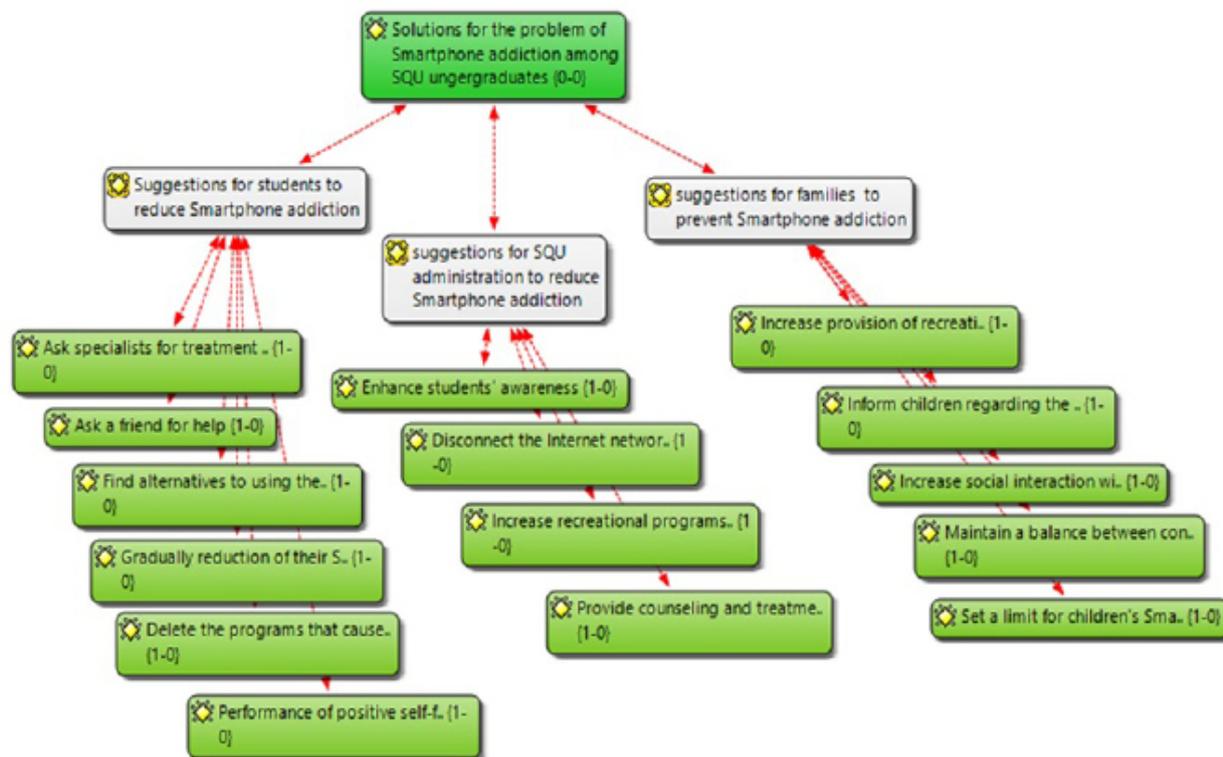


Figure 4: Solutions for the problem of Smartphone addiction among SQU undergraduates.

Discussion

Reasons behind Smartphone addiction among SQU undergraduates

The current 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: Using Smartphones

additional reason was the absence of public sensitization programs regarding the disadvantages of Smartphone heavy usage on users’ health, finance, time, and social relationships. Considering previous studies, the current research supports the findings of Casey [9] and Szapkow, Stryzhak and Prokopowicz [38] in terms of identifying that disregard of harmful consequences had the highest mean compering with other Smartphone addiction symptoms.

This possibly relates to the fact that some students were not aware of these harmful consequences on their health, time management, social life, finance and academic achievement currently and in the future. However, maybe they knew these consequences but disregarded them in order to continue using their Smartphones. This would imply a gap between their perception and actual use. The fact that such people continue to use their Smartphones despite having knowledge of potential harmful consequences that should concern researchers in terms of the behavioral and psychological mechanisms that play a role in defining the problem of Smartphone addiction. It is worth noting here that the medical literature has suggested that the electromagnetic radiation of Smartphones might also affect biological systems by changing the antioxidant defense systems of human tissues, leading to oxidative stress [42].

The heaviest Smartphone's application usage among SQU undergraduates

Interestingly, the focus group indicated that WhatsApp was the heaviest Smartphone's application use among SQU undergraduates. It highlighted five specific reasons for why SQU undergraduates heavily use WhatsApp messenger as follows:

The simplicity of WhatsApp messenger use, the low cost, its 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.

Compared to previous studies, this result is in accordance with these obtained by similar studies in this field, such as those by Hassanzadeh et al. [26] and Igarashi et al. [27]. These studies found that text messaging was the most popular feature among young users. Moreover, this finding tends to support Lecturer et al. [30] observation that university students were addicted to WhatsApp messenger usage.

The results of the current study relate to the fact that messages can be composed and sent in a short time from virtually anywhere. Students prefer WhatsApp messages because the service is quick, cheap and convenient. They also use text messaging to coordinate with both friends and family [43].

Solutions for the problem of Smartphone addiction among university students

The solutions that students can adopt to get rid of the problem of Smartphone addiction were suggested as follows: delete the programs that cause addiction; performance of some positive self-fulfilling activities and increased social networking; ask a friend for help; ask specialists for treatment of Smartphone addiction; find alternatives to the use of Smartphone as entertainment and reduce the use of Smartphone gradually.

However, the solutions that the SQU can follow to reduce the problem of Smartphone addiction among the students, were as follows: disconnect the Internet network inside the classroom; increase recreational programs and encourage social networking; enhance awareness through outreach programs on Smartphone addiction and provide counseling and treatment programs for Smartphone addiction.

Moreover, the suggested solutions that parents can adopt to help their children reduce the problem of Smartphone addiction were the following: educate their children regarding the risks of Smartphone addiction; increase recreational programs; increase social interaction

within and outside the family; balance control and confidence in dealing with their children's Smartphone use; set a limit for their children's Smartphone's bills.

Conclusion

Recently Smartphone addiction has become serious. Therefore this study has attempted to investigate addiction reasons and solutions among Sultan Qaboos University undergraduates. Focus group discussions were used to gain insight into students' attitudes and perspectives regarding the reasons behind Smartphone addiction and how to overcome this problem. The results specified two types of reasons behind students' Smartphone addiction: reasons related to students and reasons related to Smartphone manufacturers. The results also revealed that SQU undergraduates disregarded the harmful consequences of Smartphone addiction because they focus on the benefits of usage more than in the negative consequences; they are obsessed with their Smartphone use; they deny the evidence about the health harmful consequences; and have no possibility of stopping using their Smartphone. The results also discovered that SQU undergraduates heavily used WhatsApp messenger because of the simplicity of WhatsApp messenger use, the low cost, its numerous positive uses, the program's good features, such as group chatting, sending photos, video, location, and contacts, and the possibility of broadcasting WhatsApp messages to various contacts. Finally, the results offered a number of solutions that students can adopt to get rid of the problem of Smartphone addiction and solutions that SQU can explore to reduce the negative effects of this addiction. Besides, it provided other solutions that the parents can adopt to help their addicted children.

Research Implications

This study is one of the most detailed investigations of Smartphone use in Oman, and one of the first to examine Smartphone addiction in academic communities. It is a vital research project because it providing a comprehensive understanding of the context for Smartphone use among SQU undergraduates in Oman.

The study can provide guidance for institutions, addiction centers, and families on reasons and solutions of Smartphone addiction among university students. It will, furthermore, assist educators in understanding how students misuse Smartphones to gratify their psychological needs and in suggesting appropriate solutions and alternatives in order to reduce the addiction. The most important task, however, is to make students aware of their Smartphone usage behavior.

Future Research Direction

The purpose of this study was to outline the various Smartphone addiction reasons and solutions among Sultan Qaboos University undergraduates using focus group discussions. Future qualitative research in this area might conducted to answer the following questions:

- Are there any gender differences in Smartphone addiction among university students?
- Are there significant differences in Smartphone addiction among university students related to the following demographic variables (student field of study, parents' education, and family income)?

Competing Interests

The authors declare that they have no competing interests.

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