Smartphone Gratifications among Sultan Qaboos University Undergraduates: A Mixed-Approach Investigation

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Authors' contributions

This work was carried out in collaboration between all authors. Author HAS-B conducted the literature Search, wrote the first draft of the manuscript, made all changes suggested by the reviewers in collaboration with author AB, and served as the corresponding author. Author AB revised and edited the first and final draft of the manuscript. Author NHJ made some comments. Author AAZ made some suggestions related to the statistical analysis. All authors read and approved the final manuscript.

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ABSTRACT

This study investigates key elements in the Smartphone gratifications among Sultan Qaboos University (SQU) undergraduates, the relationship between these gratifications and student academic achievement, and any discernible differences. The research applied a mixed-method approach consisting of both quantitative (questionnaire) and qualitative (focus group discussions) methods. The quantitative data were collected through a questionnaire on Gratifications of Smartphone use (GSPUQ), using a sample of 138 undergraduates at Sultan Qaboos University (40.3% male, 59.7% female). This instrument was developed to measure the following six gratifications: social interaction, information sharing and entertainment, self-identity and conforming, self-development and safety, freedom and privacy, self-expression and gossip, using

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the Use and Gratifications Theory (UGT) as a framework. The qualitative data were collected through focus group discussions. Sixteen SQU undergraduates participated voluntarily in the focus group discussions. The findings revealed that information sharing and entertainment constituted the most common gratifications for Smartphone use among SQU undergraduates. There were no significant relationships between Smartphone gratifications and academic achievement except for self-development and safety. Nor were there gender differences on Smartphone gratifications, except for self-development and safety, and freedom and privacy. In self-development and safety female students scored significantly higher than male students. However, male students scored higher than female students in freedom and privacy.

1. INTRODUCTION

Smartphone use is rapidly spreading globally. In fact, the world mobile phone market now includes approximately 6.8 billion subscribers [1] and more than 1.08 billion are Smartphone users. Oman is no exception. According to the Telecommunication Regulatory Authority (TRA), the mobile phone penetration rate (the number of subscriptions per 100 people) was 190.29% at the end of Q4 2012 [2].

The rapid widespread of Smartphone can be attributed to many factors, among which are the fact that these new gadgets are faster, lighter, stronger, and more convergent than ever before. Also, they come with different features that attract users, such as a digital camera, a movie camera, a diary, a phone book, a GPS, a radio, MP3 player, a web browser, a data storage device, an encyclopedia, an alarm clock, a dictaphone, a personal organizer, a flashlight. All these extras make the majority of people in developed and developing countries use mobile phones [3].

While Smartphone use has been increasing in different economic and age sectors, university students have been targeted as one of the most important user groups of Smartphone services [4]. Hong, Chiu and Huang [5] argue that mobile phones are popular among students because they increase their social communication and expand their opportunities for making relationships.

Hooper and Zhou [6] identified seven different gratifications for mobile phone usage. The first is *"social interaction"*, where people want to stay in touch with their friends and families. The second is *'dependency'*, where people rely on their mobile phones so much that they feel lost without them. The third gratification is *'image/Identity'* where people use these phones to bestow status or confirm a group identity. *'Safety'* is the fourth gratification, which is the most frequently mentioned reason for purchasing a mobile phone. Hence a use for personal or family emergencies emerges. The fifth gratification is *'Job-related'* and the sixth is *'freedom',* because, for example the mobile phone increases children's privacy and reduces the possibility of parents being able to control their communication. The final gratification is *'gossip',* because people use mobile phones for more extended chatting with friends and family members.

It is also important to understand why university students use a Smartphone as a medium and what gratification they receive from it? By applying Uses and Gratification theory (UGT), Grellhesl and Punyanunt-Carter [7] identified seven gratifications for using the Short Message Service (SMS) among university students in Japan. These were socialization and affection, immediate access and mobility, relaxation/escape, entertainment, information seeking/coordination, and status. Therefore, the aim of this study was to understand the use and gratification of Smartphones and their relationship with Sultan Qaboos University (SQU) undergraduate students' academic achievement. It also aimed to explore the different gratifications of their Smartphone behavior. To obtain these outcomes, the study focused on the following:

1) Analyzing the different Smartphone gratifications among SQU undergraduates.
2) Identifying the Smartphone gratifications associated with positive and negative Smartphone usage among SQU undergraduates.
3) Clarifying the relationship between Smartphone gratifications and SQU undergraduates' academic achievement.

4) Investigating any gender differences in the Smartphone gratifications among SQU undergraduates.

2. PROBLEM STATEMENT

The use of Smartphone in the academe provides benefits to the students, to faculty members and to the academic institution itself. By enabling access to timely and accurate information, Smartphones give students the ability to communicate and interact with family members, friends, school administrators, teachers, communities, and the government at all levels at any time and from anywhere. Faculty members are able to interact with students even beyond class hours, to answer questions, provide research direction, or clarify instructions. Smartphone also allows them to coordinate and communicate with colleagues and administrators on school-related matters. This ability to communicate and interact is one of the most significant benefits of using Smartphone technology in education. Smartphone also provides faculty with more options and flexibility in terms of course content and delivery, allowing them to incorporate eLearning and online activities to enrich regular classroom-based instructions. The main benefits for school administrators are faster communication, better coordination, and increased capability to meet the demands of students and faculty for access to information to do research, fostering creativity in the academic setting [8].

Although many studies have explored mobile phone gratification, until now there have been only few previous studies that explored Smartphone gratification among university students. Hence, applying the role of Use and Gratifications Theory (UGT) to do this can greatly reduce the gap in literature which now exists and provide further insight into which needs are being satisfied through smartphone use. UGT, while rooted in the field of mass communications, can be applied usefully in this study to gain a better understanding of what drives university students to use Smartphones. Besides, this theory is also suitable due to the fact that it considers Smartphone users as an 'active audience' and focuses on what people do with this medium and why people adopt it.

In addition, this study will use a novel technique which is wheel measurement will make possible to examine what drives students to use Smartphones. Glaser [9,10] applied this technique to analyze the genes of leadership. It allowed her to identify 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. Applying this technique in the present study will identify with great accuracy the gratifications of Smartphone use behavior in general and the specific gratifications associated with Smartphone use among SQU undergraduates in particular.

Most of the Smartphone gratifications previous studies used a quantitative approach, which seems surprising, given the nature of the topic that, in all its complexity, is inextricably bound up with meaning and values, requiring a great deal of interpretation and judgments. Hence, the present study used a mixed approach investigation, consisting of both quantitative and qualitative method, to achieve a comprehensive understanding of Smartphone gratifications among SQU undergraduates. The present study, then aims to answer the following research questions:

1) What are the Smartphone gratifications among SQU undergraduates based on UGT?
2) What are the gratifications associated with positive and negative Smartphone use among SQU undergraduates?
3) Is there any significant relationship between the gratifications of Smartphone use among SQU undergraduates and their academic achievement?
4) Are there gender differences in the Smartphone gratifications among SQU undergraduates?

3. RELATED LITERATURE

3.1 Smartphone Uses and Gratifications

UGT has been a popular approach to understanding why and how people actively seek out particular media to satisfy specific needs. According to Blumler and Katz [11], UGT is used to explain motivation to use technology and especially why consumers use media to satisfy their social and psychological needs. According to Ruggiero [12] "uses and gratifications have always provided a cutting-edge theoretical approach in the initial stages of each new mass communications medium: newspapers, radio and television and now the Internet." (p.1). Ballard [13] adds that "The uses and gratifications

approach places power in the hands of the audience and is a helpful perspective when trying to understand media usage, exposure and effects" (p. 2).

Various studies have applied this theory and the general conclusion is that "the gratifications sought motivate the use of a particular medium in an audience" [14] (p.3). Consequently, a growing number of studies have applied this theory when investigating the motivations for Smartphone use among university students.

Leung and Wei [15] found that *mobility, immediacy and instrumentality* were the strongest instrumental gratifications in predicting the use of mobile phones, followed by intrinsic factors such as *affection/sociability*. Subscription to functionally enhanced services, such as call transfer and caller ID appears to be an important predictor for use, especially for those who are always on the go. As expected, the use of mobile phones on buses, in cars and on trains or in malls and restaurants is strongly linked to mobility and immediate access gratification. Furthermore, young and less educated women tend to talk for long time in each call. Finally, talking to co-workers and business partners via mobile phones appears to be for instrumental reasons, while talking to immediate family members is for showing affection.

Park [16] examined the ritualized and instrumental gratifications for mobile phone use among university students using a revised version of the Television Viewing Gratifications Scale developed by Rubin (1983). The scale consisted of a five-point Likert-type scale with 27 items and measured such user underlying gratifications as *relaxation, habit, passing time, entertainment, social interaction, information, arousal and escape*.

For Aoki and Downes [17] focus group discussion results provided a preliminary understanding of university students' beliefs and motivation regarding mobile phone use. Nine motivational themes emerged from the focus group, providing insights into feelings, personal experiences, emotions, intuitions and subjective judgments. These themes were *personal safety, financial incentives, information access, social interaction, parental contacts, time management/ coordination, dependency, image, and privacy management*.

By contrast, Flanagin [18] examined the gratifications for using instant messaging (IM)

among college students using UGT. Four factors emerged. These were social entertainment, task accomplishment, social attention, and meeting new people. First, the *social entertainment* factor included 12 items. These were to communicate easily, to do something convenient, to do something fun, to stay in touch, to be entertained, to find out interesting things, to pass time when bored, to get to know others, to provide information, to do something exciting, to do something with others, and to play. These explained 54% of the variance. Second, the *task accomplishment* included 9 items. These were to learn how to do things, to solve problems, to gain insight into self and others, to motivate ideas, to negotiate or bargain, to make decisions, to get people to do something for me, to impress people, and to learn about self and others. These explained 7% of the variance. Third, the *social attention* factor included three items, which were to feel less lonely, to feel important, and to relax. They explained 3% of the variance. Finally, the *meet new people* factor included two items, which were to talk to people around the world and to meet new people, and they explained 3% of the variance.

Chen [19] conducted a study to assess whether mobile phone communication gratifications around family or friends were especially useful for predicting university students' mobile phone dependency. His study selected six mobile phone communication gratifications associated with family (*pleasure, affection, inclusion, escape, relaxation, and Control*). Likewise, six communication gratifications concerning friends, such as *pleasure, affection, inclusion, escape, relaxation, and control*). The results indicated that participants had stronger gratifications for communicating with their friends than with their family by mobile phone. Over 1/3 of their calls were connected with family.

On the other hand, Walsh, White and Young [20] investigated factors underlying mobile phone use applying UGT as a framework. Three gratifications *(self, social, and security)* were revealed. Social and self-gratification predicted the level of use and addictive tendency, with self-gratification exhibiting the greatest impact on the three addiction indicators.

Likewise, Leung [14] examined the gratifications for SMS use among university students and how these, together with unwillingness-to-communicate and the shortcomings of SMS, could explain the usage pattern of this

widespread form of mobile text messaging. The results showed that *convenience and low cost, entertainment, coordination and fashion* were strong instrumental gratifications for students who made the heaviest use of SMS, while *affection and escape* were intrinsic factors. When compared to non-users, SMS users tended to be male students with a high household income. They were more socially anxious or felt less valued in face-to-face communication.

Alternatively, Reid and Reid [21] conducted a study that examined the different kinds of gratification anxious and lonely people received from using the Internet and mobile phones. They identified five factors underlying mobile e-mailing: *self-presentation, intimacy, appearances, escapism and last resort*. Lonely participants preferred to communicate with others over the phone, while anxious people preferred a more text-based Internet when interacting. However, both groups listed their preferred medium as allowing for more intimacy than the alternative option. Anxious users said that texting on phones was preferable to talking on them.

Interestingly, Lo and Leung [22] explored the effects of gratification opportunities and gratifications-obtained on preferences for Instant Messaging (IM) and e-mail among university students. Their study aimed to discover the gratifications behind university students' choice of IM and e-mail use. Their findings showed four factors behind gratifications obtained from IM and e-mail. These included *peer pressure/entertainment, relationship maintenance, freer expression, and sociability*. Regression analysis also revealed the multi-function gratification opportunity of IM. These included the gratifications obtained from the mutual use of IM among their peers, a feeling that IM improves their social relationships and that IM provides an environment for freer expression.

Iqbal [23] investigated interpersonal gratifications for using mobile phones among university students as well as gender difference. The results suggested that people fulfilled their interpersonal needs more adequately when using text messaging than when using a voice call. Six interpersonal gratifications for both voice calls and text messaging were revealed including *pleasure, inclusion, control, affection, escape, and relaxation*. The major interpersonal gratifications for using two channels (voice call and text messaging) were relaxation, inclusion,

and affection. It was clear that for university students communicating through a mobile phone was to chill out (relaxation), be with someone (inclusion), and exchange care (affection) with their partners.

Contrarily, when Paragas, Clara, Main and Abdul Rahman [24] surveyed mobile phone usage among Singaporeans aged 55 and older, their study found significant differences in the patterns of mobile phone use and the gratifications attributed to it across respondent groupings according to age and phone ownership. Four gratifications, *sociability, immediacy, mobility and security* were revealed. Among the various use gratifications combinations, the strongest and most significant correlations were observed between the use of functions and mobility, sociability and immediacy. Among the gratification variables, security was the only one to be negatively, if mostly not significantly, correlated with use variables.

Grellhesl and Punyanunt-Carter [7] analyzed the most highly sought gratifications for using SMS text messaging among university students. They identified seven: *Immediate access and mobility, relaxation/escape, entertainment, information seeking/coordination, socialization and affection,* and *status*. They also discovered which gratifications were most and least popular as well as significant differences between males and females when UGT was applied. Their study revealed that there were gender differences among specific gratifications sought through text messaging.

In Malaysia, Balakrishnan and Loo [25] explored mobile phone and short message service (SMS) use among urbanized university students. UGT was used to explore phone purchasing factors, reasons for using a mobile phone and SMS, together with usage pattern and related behavioral issues. The gratifications revealed for using a mobile phone were: *socializing, privacy, status symbol*, and *safe*ty. On the other hand, gratifications for SMS use included *to make/cancel appointments, to gossip and maintain relationship, providing privacy, cheapness, ease and speed of use.* The findings also revealed that students considered brand, trend and price as the three most important purchasing factors, while *socializing* and *privacy* were the most important reasons for phone use. SMS was mostly used to organize social appointments and to keep in touch with families and friends.

Ishii [26] focused on how use patterns and motivation were associated with the negative effects of mobile phones. Factor analysis of motivations yielded two factors, namely, *emotionality* and *instrumentality*. The first factor significantly correlated with the frequency of mobile e-mailing and delinquency score. However, despite the significant and positive correlation, the effect of mobile e-mailing on delinquency and school grades was not significant when controlling motivation factors.

Table 1 provides a summary of the different motivations identified in previous studies on mobile phone use.

Table 1. An overview of previous UGT studies

Author(s)	Research areas	Research methods	Identified motivations
Leung & Wei, [15]	Mobile phone	Qualitative	Fashion/status, affection/sociability, relaxation, mobility, immediacy,
Aoki & Downes, [17]	Mobile phone	Qualitative + quantitative	Personal safety, financial incentive, information access, social interaction, parental contacts, time management, dependency, image, privacy management.
Park, [16]	Mobile Phone	Quantitative	Relaxation, habit, pass time, entertainment, social interaction, information, arousal and escape
Flanagin, [18]	Instant Messaging	Quantitative	Social entertainment, task accomplishment, social attention and meet new people
Reid & Reid, [21]	Internet and mobile phones	Quantitative	Self-presentation, intimacy, appearances, escapism and last resort
Chen, [19]	Mobile Phone	Qualitative + Quantitative	Social support, information seeking, emotional dependency
Walsh et al., [20]	Mobile Phone	Quantitative	Self, social and security
Leung, [14]	SMS	Quantitative	Convenience and low cost, entertainment, coordination and fashion were strong instrumental gratifications for students who made the heaviest SMS use, while affection and escape were the intrinsic gratifications for them.
Lo & Leung, [22]	Instant Messaging	Quantitative	Peer pressure/entertainment Relationship maintenance Sociability Freer expression
Paragas et al., [24]	Mobile Phone	Quantitative	Sociability, immediacy, mobility and security
Iqbal, [23]	Mobile Phone	Quantitative	Pleasure, affection, inclusion, escape, relaxation and control
Ishii, [23]	Mobile e-mailing	Quantitative	Emotionality and instrumentality
Grellhesl & Punyanunt-Carter, [7]	Text messaging	Quantitative	Access & mobility, coordination for business, socialization & affection Status, relaxation & escape, information seeking, entertainment
Balakrishnan & Loo, [25]	Mobile phone & SMS	Quantitative	Mobile phone: Socializing, privacy, status symbol and safety. SMS: to make/cancel appointments, gossip and maintain relationship, to provide privacy, cheap, easy to use and quick

3.2 The Relationship between Smartphone Use and University Students' Academic Performance

Although there were no previous studies that especially explored the relationship between the gratifications of Smartphone usage among SQU undergraduates and their academic achievement, the literature explores this motivation in general. Some studies have highlighted the positive role of Smartphones in advancing students' learning. In this regard, Cheon, Lee, Crooks and Song [27] 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. Also, mobile learning can play a significant and supplementary role within formal education. Markett, Sánchez, Weber and Tangney [28] observed the positive effects of mobile phone use among students and recommended using SMS in classrooms. They found that knowledge can be gained through enhanced interactivity among students throughout a lecture by using SMS.

Interestingly, Javid, Malik and Gujjar [29] investigated the effects of mobile phone use on the performance of university students. In their study, most of the students claimed that they used mobile phones to contact their teachers and classmates to discuss matters related to their study. They also used the mobile phone to share useful information with their classmates and to consult a dictionary and a thesaurus for educational purposes. Nevertheless, they agreed that the mobile phone wastes precious time and money.

On the other hand, many studies have correlated Smartphone use with a decrease in academic achievement. Based on such findings, a lot of scholars have highlighted the negative consequences of mobile phones use among university students. [30-32] recognized this challenging dimension. Kubey, Lavin and Barrows [33] suggested that the heavy use of technology for recreational purposes is highly correlated with reduced academic performance. Sheereen and Rozumah [34] found that mobile phones have been widely accepted by Malaysian university students. However, results showed that personal and family factors influenced the university students' use. Although students in their study depicted good mobile phone computing behavior, factors that may promote the intensity of their mobile phone use are worth noting. As a result, [34] indicated that "although the mobile phone has become vital to many college students, it may also affect students' academic performance" (p. 206). Casey [35] found that male and higher grade students tended to use Smartphone for information seeking.

Similarly, Aoki and Downes [17] announced that many American students normally make calls at night, which results in less sleep and other problematic issues that may affect their academic performance. Also, Rau, Gao and Wu [36] explored the impact of mobile communication technologies, such as SMS, emails and online forums on students' learning motivation, pressure and performance. The results showed that instant messaging helps to bond student and instructor in the instruction process effectively. When combined with Internet communication media, it can significantly increase students' extrinsic motivation without causing higher pressure. It is worth pointing out here that communication media demand public expression rather than private dialogue which should be adopted with caution since it may raise students' pressure and ultimately affect their performance.

Pierce and Vaca [37] examined the differences in academic performance between teen users and non-users of various communication technologies. The results revealed that approximately 75% of the students in their study had a MySpace account and a mobile phone and more than 50% had an IM account. The results also showed that those who had a MySpace account, mobile phone and IM had significantly lower grades than those who did not. Results further revealed that students who used their MySpace, mobile phone and IM while doing their homework reported lower grades than those who did not do this. Finally, the results revealed that 28% of them sent text messages during class lectures (from "always" to "frequently") and 5% reported text messaging during an exam (from "always" to "frequently").

Likewise, Srivastava [32] found that UK students used mobile phones during lectures and some said that they cannot leave home without their mobile phone. Szpakow, Stryzhak and Prokopowicz [38] found that most were convinced about the harmful effects of mobile phone use on their lives. Also, Hong et al. [18] found that mobile phone use affected their students' academic performance, including time management and other related problems.

3.3 Gender Differences in Smartphone Gratifications

A theme of interest to many researchers relates to gender differences in Smartphone use. Balakrishnan and Raj [39] examined the gratifications for mobile phones use among Malaysian university students. The results showed that female students used their mobile phones mainly to socialize, gossip and as a safety device.

Interestingly, Iqbal [23] divided mobile phone users into three groups: casual, moderate and excessive. On the casual and moderate levels, young adult females had a stronger drive to fulfill their interpersonal gratifications, but on the excessive use level men showed greater motivation in nearly all contexts combing gender gratifications and two channels. The results showed that males age of between 21-23 years in particular, made and received more voice calls than others. As far as text messaging frequency was concerned, males and the 21-23 age groups were at the forefront.

Osman, Sabudin, Osman and Shiang-yen [40] explored the attitude and behavior of Malaysian consumers towards the various types of Smartphone use such as employing application software, e-mail, Internet browsing, ringtones and other mobile functions. Their findings indicated that male and young consumers were generally a main target market. On the other hand, female consumers had a higher tendency to adopt or purchase ringtones and wallpapers, which were meant to decorate or personalize their Smartphone. In other words, male consumers might prefer those mobile contents that were practical and useful to fulfill their information needs.

Moreover, some studies have found that females use mobile phone more than males. Igarashi, Takai and Yoshida [41] reported that girls established interpersonal relationships through text messages more often than boys. Similarly, Wilska [3] emphasized that girls overused mobile phones to send text messages and to make phone calls more frequently than boys, who focused more on the stylish looks and technical features of a phone because they were very interested in new technologies. By contrast, Ling [42] found that during the period between 1997 and 2001, mobile phones were more often used by boys than girls, as they first treated them as a technical innovation. However, since 2001 girls have started to use mobile phones more frequently than boys, as they have become their main tool for developing interpersonal relationships.

According to Geser [43], while boys were somewhat slower than girls in adopting the mobile phone universally, they tend to use it on the same scale by producing the same monthly bills. In other words, both genders are rather similar in the quantitative intensity of use, but they still differ significantly in qualitative patterns and purposes. In fact, men and women have always been found to maintain quite different attitudes toward mobile phones.

However, other studies have proved that gender and mobile phone use are non-significantly related. For example, Prezza, Pacilli and Dinelli [44] argued that mobile phone use among university students did not depend on gender and socio-economic status. Most studies have established that extreme use of mobile phones is just a waste of time.

By contrast, Takao et al. [2] claimed that gender appeared to be a weak predictor of problematic mobile phone use. Females were likely to experience more frequent difficulties. They argued that cultural or ethnical background might influence the addictive behaviors in females. In western countries, gender differentiation is not as severe as that in Asian countries, including Japan, where females are still expected to behave modestly. Such social pressure might cause the problematic use of mobile phone.

In Pakistan, Kamran [45] investigated mobile phone calling and texting patterns among university students. He found that the majority were extremely heavy users of mobile phones, especially text messages, regardless of their gender. For instance, his results showed that the average number of received calls by male students was 4.3 and 4.1 by female students on the diary day. Also, the number of average of dialed calls made by male students was 3.9 and by female students 3.4. However, students reported an incredibly high rate of SMS communication on the diary day. The average figure for male students was 98.4 and for females (85.7). Similarly, the average number of text messages sent was almost same for male and female students. Males sent 109.5, while females sent 98.2 text messages per day.

4. RESEARCH METHODOLOGY

A mixed approach investigation was used in this study to explore in detail Smartphone gratification among SQU undergraduates. Data collected through the questionnaires, and the focus groups discussions were triangulated in order to extrapolate overall insights and discussion. The quantitative data were collected through a questionnaire on Gratifications of Smartphone Use Behavior (GSPUBQ), using a sample of 138 undergraduates at Sultan Qaboos University (40.3% male, 59.7% female). This questionnaire, which was developed to measure these gratifications using the UGT as a framework, was adapted and modified from those in [20] and [35]. Then, the contents of the questionnaire were validated and the translation checked by a group of referees from the Department of Information Studies at the College of Arts and Social Sciences and the Department of Psychology and the Department of Educational Technology at the College of Education at Sultan Qaboos University.

It used a five-point Likert-type scale selected to provide information illustrating the gratifications of Smartphone usage. Table 2 summarizes how the gratifications of Smartphone use questionnaire were developed.

This questionnaire consisted of six gratifications that influence Smartphone use and each gratification had seven items as follows:

— ***Social interaction***: It included seven items (1, 2, 3, 4, 5, 6, 7) about the use of Smartphones for the purpose of social interaction and to stay in touch with friends and families (e.g., I use my Smartphone for continuous and effective communication with others).

— ***Information sharing and entertainment***: It included seven items (8, 9, 10, 11, 12, 13, 14) which explain the role of Smartphone as an essential tool in students' life for information seeking, sharing and experiencing collaboration with others. These also reflected the acquisition of Smartphones for study-related reasons (e.g. I depend on my Smartphone to share information with other in my field). Students use their phones also for entertainment purposes, for instance, to play games, listen to music, watch movies…etc. (e.g., I use the entertainment programs in the Smartphone, for example: movies player, music player and games to get rid of boredom and to have fun).

— ***Self-Identity and conforming***: It included seven items (15, 16, 17, 18, 19, 20, 21) which illustrate how Smartphones are seen by some students as giving status or conforming group identity. In this regard, the Smartphone and its use helps students to personalize their phones, express themselves and confirm their belonging to a particular group of friends (e.g. I change my Smartphone frequently to feel special among my friends).

— ***Self-development and Safety***: It included seven items (22, 23, 24, 25, 26, 27, 28) which reflect the reasons mentioned for purchasing a Smartphone, which are to, enhance self-completeness and to feel safe, deal with conflict situations, increase self-confidence, parental closeness and ideas diffusion (e.g., the Smartphone helps me in emergency situations).

— ***Freedom and Privacy:*** It included seven items (29, 30, 31, 32, 33, 34, 35) which reflect the role of Smartphones in providing privacy and giving freedom to student to contact others at any time, which must be associated with responsibility and respect for others' privacy (e.g., the Smartphone allows me to express my feeling and opinions freely).

— ***Self-expression and Gossip***: It included seven items (36, 37, 38, 39, 40, 41, 42) which clarify the role of Smartphone in making students keep in touch, but also for more extended gossiping with friends and families (e. g., Smartphone applications offer a chance to meet new friends and exchange views with them).

To examine the reliability of the questionnaire, the researchers tested its internal-consistency using the Alpha Cronbach Coefficient. The results revealed that the questionnaire as having a high consistency of 0.910 (Table 3).

Furthermore, to examine the validity of the questionnaire, the researchers used the concurrent validity by correlating respondents' mean scores on the present study questionnaire with Hooper and Zhou [6] Usage Behavior Questionnaire. The results revealed a significant correlation of 0.734 between the present study questionnaire and the concurrent validity questionnaire (Table 4).

Table 2. The variables of the gratifications of Smartphone use questionnaire

The genes of leadership Glaser [9, 10]	The gratifications of mobile phone usage Hooper and Zhou [6]	The uses and gratifications of Smartphone Grellhesl and Punyanunt-Carter, [7]	The gratifications of Smartphone use Current study
Community *Including vs. excluding*	Social interaction	Socialization/affection	Social Interaction
Humanity *Appreciating vs. blaming*	Freedom	accessibility/mobility,	Freedom and Privacy
Expressing *Developing vs. dictating*	Gossip	relaxation/escape	Self-express and Gossip
Gratificationrativity *Wondering vs. Knowing*	Job-related + Dependency	information seeking + entertainment	Information seeking and entertainment
Navigation *Sharing vs. withholding*			
Aspiration *Striving vs. Fearing*	Safety	coordination for business	Self-developing and Safety
Spirit *Celebrating vs. conforming*	Image/Identity	Status	Self-Identity and conforming

Table 3. Reliability of the gratifications of Smartphone usage behavior questionnaire (GSPUBQ)

The Gratifications of Smartphone Use Questionnaire (GSPUQ)		Alpha Cronbach Coefficient
Factors	Social Interaction	0.54
	Freedom and Privacy	0.72
	Self-expression and Gossip	0.79
	Information seeking and entertainment	0.75
	Self-development and Safety	0.78
	Self-Identity and conforming	0.78
The whole questionnaire		0.91

Table 4. Concurrent validity of the gratifications of Smartphone use questionnaire (GSPUQ)

The gratifications of Smartphone use questionnaire (GSPUBQ)		Smartphone usage behavior questionnaire
Factors	Social Interaction	0.52**
	Freedom and Privacy	0.29**
	Self-expression and Gossip	0.67**
	Information seeking and entertainment	0.46**
	Self-development and Safety	0.49**
	Self-Identity and conforming	0.64**
The whole questionnaire		0.73**

*Note:**Correlation is significant at the 0.01 level (2-tailed).*

1) Moreover, the qualitative data were collected through focus group discussions. Sixteen SQU undergraduates participated voluntarily 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. 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). Thematic data analysis was conducted to draw out qualitative data about SQU undergraduates' attitudes and perspectives regarding Smartphone gratifications. Specifically, the

qualitative data will help interpreting the quantitative result for questions three and four.

5. RESULTS

5.1 The Main Smartphone Gratifications among SQU Undergraduates

The results in Table 5 reveal that information sharing and entertainment was the most common Smartphone gratification among SQU undergraduates (3.94), while self-identity and conforming was the least common Smartphone gratification among SQU undergraduates (3.09).

Table 5. Smartphone gratifications among SQU undergraduates (N=136)

Rank	Smartphone Gratifications	Mean
1	Information sharing and Entertainment	3.94
2	Social interaction	3.58
3	Self-expression and Gossip	3.46
4	Freedom and Privacy	3.44
5	Self-development and Safety	3.28
6	Self-identity and Conforming	3.09

5.2 The Gratifications of Smartphone Associated With Positive and Negative Smartphone Usage among SQU Undergraduate Students

The results in Fig. 1 reveal that Information sharing and entertainment was the most common Smartphone use gratification among SQU undergraduates (3.94). In this gratification, students show five positive usage behaviors and two behaviors considered as progressing towards negative behaviors. Social Interaction was the second most common Smartphone usage gratification among SQU undergraduates (3.58). In this gratification, students show three positive use behaviors, two behaviors considered as progressing towards negative behaviors and one negative behavior. Self-expression and Gossip was the third most common Smartphone usage (3.46). In this gratification, the students show four positive behaviors and three behaviors considered as progressing towards negative behaviors. Freedom and Privacy was the fourth most common Smartphone gratification (3.44). In this gratification, the students show three positive behaviors, three behaviors considered as progressing towards negative behaviors and one

negative behavior. M4 (Self-development and Safety) was the fifth most common gratification among SQU undergraduates (3.28). In this gratification, the students show seven behaviors considered as progressing towards negative behavior. M3 (Self-Identity and conforming) was the least common gratification (3.09). In this gratification, the students show three positive usage behaviors and three behaviors considered as progressing towards negative behavior.

5.3 The Relationship between Smartphone Gratifications among SQU Undergraduates and their Academic Achievement

The results in Table 6 reveal that there was no significant relationship between Smartphone gratifications and academic achievement except self-development and safety. Moreover, the focus group participants as a whole advanced two reasons to elucidate why there were no significant differences among SQU undergraduates in terms of Smartphone gratifications, according to academic achievement. These explanations were as follows:

1) There were similarities in Smartphone gratifications among SQU undergraduates regardless of their academic achievement; and 2) There were similarities in their daily requirements regardless of their academic achievement. In sequence, the following comments illustrate each explanation:

"I think there were no significant differences between SQU undergraduates in terms of Smartphone gratification motives, according to the academic achievement, because the motives of Smartphone use among SQU undergraduates were similar" (P 15)

"…maybe because there were similarities in the daily academic requirements among SQU undergraduates regardless of their academic achievement" (P 4)

5.4 The Gender Differences in Gratifications of Smartphone Use among SQU Undergraduate Students

The results in Table 7 reveal that there were gender differences in the gratifications of Smartphone use on self-development and safety; female students scored significantly higher than

male students. Likewise, there were gender differences on freedom and privacy; male students scored higher than female students in this gratification. The focus group participants as a whole attempted to explain why female students use Smartphones to gratify self-development and safety, while male students use Smartphone to gratify freedom and privacy. The majority of focus group participants, of both genders, agreed that the following explanations were the most significant:

1) Most female students live on the university campus, so they depend on their Smartphones for information searching and self-developing.
2) Socially, female students do not have many alternatives for entertainment, so they use their Smartphones to seek entertainment.
3) Male students have many alternatives for self-developing through training, workshops, and travelling.
4) Females' psychological characteristics are different from those of males, which means they need their Smartphones in order to feel safe, especially in emergencies. Moreover, from the males' point of view

female students are addicted to Smartphone use for self-development and safety because most of them do not have cars and they live in the university residences. As a result, their Smartphones are the practical choice for gratifying this motive. One of the male students highlighted this point:

"From my view, female students are addicted to using Smartphones for seeking information and entertainment self-development and safety because most of them do not have cars and they live in the university residences." (P 5)

However, from the females' point of view they cared about their studies more than male students did, so they used their Smartphones for academic purposes. One of the female students expressed this view as follows:

"As a female student, I think we are addicted to using our Smartphones for self-development and safety because we care about our studies more than male students do. So we use our Smartphones positively for academic purposes" (P 11)
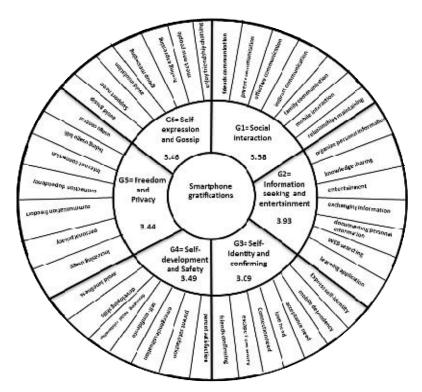

Fig. 1. DNA Wheel Measurement of Smartphone gratifications among SQU undergraduates based on [13,14]

Table 6. The relationship between Smartphone gratifications students and academic achievement

Smartphone usage gratifications	Academic achievement
Social Interaction	0.19
Information sharing and entertainment	0.03
Self-Identity and conforming	0.06
Self-development and Safety	0.23*
Freedom and privacy	0.17
Self-expression and Gossip	0.05-

*Note: *Pearson Correlation *Significance (2-tailed)*

Table 7. Gender differences in gratifications of Smartphone use among SQU undergraduates using independent samples T-test

Smartphone usage Gratifications	Gender	N	Mean	SD	"T" value	P
Social interaction	Male	56	3.58	0.44	.138	0.89
	Female	80	3.57	0.62		
Information sharing and entertainment	Male	56	3.84	0.54	1.53	0.12
	Female	80	4.00	0.60		
Self-Identity and conforming	Male	56	3.15	0.63	.707	0.48
	Female	80	3.06	0.84		
Self-development and safety	Male	56	3.11	.60	1.84	0.04*
	Female	80	3.40	1.03		
Freedom and privacy	Male	56	3.62	1.00	2.00	0.04*
	Female	80	3.31	0.77		
Self-expression and gossip	Male	56	3.46	0.50	.071	0.94
	Female	80	3.46	0.81		

Note: significant at the 0.05 level*

6. DISCUSSION

One of the major aims of this research was to discover the main gratifications of Smartphone use among SQU undergraduates. The results reveal that information sharing and entertainment was the most common gratification. This can be attributed to the strong need for SQU undergraduates to possess information and share it for learning and entertainment purposes. SQU students from different fields of study need information to write their term papers, assignments, update their knowledge and to entertainment themselves. They find their Smartphones useful for seeking information and share it with friends and classmates. These findings agree with those of other studies [17,19, 16,46].

More specifically, our results reveal that the gratifications of Smartphone usage are associated with some positive and negative behaviors, as follows: First, information sharing and entertainment. This gratification associated with five positive usage behaviors and two behaviors considered as a progress to negative behaviors. Then there is social interaction, which is a gratification associated with three positive usage behaviors, two behaviors considered as progressing towards negative behaviors and one negative behavior. Self-expression and gossip is a gratification associated with four positive usage behaviors and three behaviors considered as progressing towards negative behaviors. Freedom and privacy is a gratification associated with three positive usage behaviors, three behaviors considered as progressing towards negative behaviors and one negative behavior. Self-development and safety is a gratification associated with seven behaviors considered as progressing towards negative behaviors. Finally, self-Identity and conforming is a gratification associated with three positive behaviors and three behaviors considered as progressing towards negative behaviors.

The results also reveal that there was no significant relationship between Smartphone gratifications and academic achievement except for self-developing and safety. This result can be attributed to the fact that SQU students from different academic achievement levels tend to use their Smartphones for nearly the same gratifications, except for self-development and

safety. This relationship between academic achievement and Self-development and Safety may be due to the fact that high-level academic achievement students tend to seek Self-development and Safety more than other students, although there were no previous studies that explored the relationship between the gratifications of Smartphone usage among SQU undergraduates and their academic achievement. Furthermore, the focus group discussions provided the following explanations: 1) Similarities in Smartphone gratifications among SQU undergraduates regardless of their academic achievement; and 2) Similarities in their daily studying requirements regardless of their academic achievement. This result differs from other studies that correlated Smartphone usage with a decrease in academic achievement [5,8,17,29,33,34,36,37,38,46,47,48].

The results also show that there were no gender differences in the Gratifications of Smartphone use among SQU undergraduates except for self-development and safety, and freedom and privacy. In M4, female students scored significantly higher than male students. However, male students scored higher than female students in freedom and privacy. This result can be attributed to the fact that SQU female students tend to seek Self-development more than male students and find their Smartphones a helpful way to satisfy this gratification. Also females use their mobile phone as a security device, particularly when they are alone at night. In addition, the focus group results highlighted other explanations. First, the majority of female students live on the university campus, so they depend on their Smartphones to search for information and self-development. Second, socially female students do not have much choice for entertainment, so they use their Smartphones to seek entertainment. Moreover, females' psychological characteristics are different from those of males because they need their Smartphones in order to feel safe, especially in emergencies. Finally, male students have many alternatives to develop themselves through training, workshops, and travelling.

This result agrees with those of [39,49]. However, male students scored higher than female students in seeking freedom and privacy. This can be attributed to the fact that male students found freedom and privacy through using their Smartphones. As for privacy, the literature has showed how Smartphones provide freedom to young users especially males. It offers a direct line to the intended recipient without any filtering by siblings or parents [8].

7. CONCLUSION

Using a novel technique which is the wheel measurement, this study investigated key elements in the gratifications of Smartphone use among SQU undergraduates. It has given a clear picture regarding Smartphone use gratifications among SQU undergraduates. First, information sharing and entertainment was the most common gratification for SQU undergraduates to use Smartphone. Hence, it is important to train students to share knowledge in order to take full advantage of smartphone, which became vital in their lives. Second, there was no significant relationship between Smartphone use gratifications and academic achievement except for self-development and safety. Therefore, it is essential to encourage SQU students to use Smartphones more for Self-development and Safety purposes. Finally, there were no gender differences in the Smartphone use gratifications among SQU undergraduates except for self-development and safety and freedom and privacy. Female students scored significantly higher than male students in using smartphones for Self-development and safety. However, male students scored higher than female students in using smartphones for freedom and privacy. It is clear that female students use Smartphones more positively than male students. Consequently, it is necessary to increase the awareness of students in general and male students in particular about the positive uses of smartphones. This study is useful for researchers and practitioners to develop a grounded understanding of Smartphone gratifications among university students and therefore be in a position to suggest solutions to help this category of users reduce the negative gratifications. As yet there have been no such studies that use both UGT and DNA Wheel Measurement to investigate this topic.

8. FUTURE RESEARCH DIRECTION

The purpose of this study was to understand the use and gratification of Smartphones among Sultan Qaboos University (SQU) undergraduates and their relationship with academic achievement. Future research in this area can be conducted to answer the following questions:

1. Are there any relationship between Smartphone gratifications and Smartphone addiction among university students?

2. Are there significant differences in Smartphone gratifications among university students related to the following demographic variables (student field of study, parents' education, and family income?

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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