Kuwaiti female university students' acceptance of the integration of smartphones in their learning: an investigation guided by a modified version of the unified theory of acceptance and use of technology (UTAUT)

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Abstract: This study employed a modified and extended version of the unified theory of acceptance and use of technology (UTAUT) to examine female Kuwaiti university students' acceptance of the use of smartphones in their learning. A quantitative research method was used. The results show that the great majority of the students used their smartphones on a daily basis and they had more than five years of experience with the use of smartphones. A regression analysis found that the six independent variables explained 46% of the variance in students' attitudes toward the use of smartphones to support their learning. However, only four independent variables were individually significant in predicting students' attitudes toward the use of smartphones to support their learning. Based on the findings, a set of recommendations related to the use of smartphones to support students' learning is provided.

Keywords: Kuwait; female; smartphone; learning; acceptance; UTAUT; unified theory of acceptance and use of technology.

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1 Introduction

It has been said that "mobile technology is changing the way we live and it is beginning to change the way we learn" (UNESCO, 2017, p.1). The emergence of smartphones has affected all aspects of our lives. Smartphones have become part of our lifestyle. Smartphones have brought changes to business, education, health services, psychology and social life (Sarwar and Soomro, 2013). The smartphone has become one of the most popular technologies in the world. In 2016, the number of smartphone users worldwide was 2.1 billion, representing about one-third of world's population (Statista, 2016). However, the diffusion of smartphones varies from country to country. In Kuwait, the smartphone adoption rate has reached about 80 percent (Ericsson, 2016). Smartphones have begun to replace bigger desktop and laptop computers among individuals and in institutions. In addition to being tools for communication, modern smartphones have similar capabilities to computers. In addition to several basic built-in functions, including clocks, cameras, Short Message Services (SMS) and internet access, each of the two major smartphone stores, Google Play and the Apple App store, has more than 2.2 million apps. There are diverse app categories such as business, entertainment, medicine, education, society, sports and many more.

Smartphone services and apps have several educational applications for university students. Based on the researchers' observations, university students use their smartphones to communicate with instructors and with each other, to search for educational information, to access university portals, to browse educational websites, to access educational references, to access productivity software, and to copy lectures. There are many apps that have been created to achieve specific educational goals in particular academic disciplines. Research has shown that the integration of smartphones in higher education would benefit all higher education stakeholders. For instance, studies have found that the integration of smartphones in higher education would improve students' performance (Mcconatha et al., 2008), facilitate and encourage collaboration in educational settings, and provide flexible access to education (Park, 2011).

Beside the general advantages of the integration of smartphones in higher education, developing countries would obtain unique benefits from the integration of smartphones in their educational systems. Examples of these benefits include increased access to education, improved quality of higher education outputs (Valk et al., 2010), and the overcoming of potential barriers due to a shortage of expensive technological infrastructure in higher education (Alturise and Alojaiman, 2013).

The use of smartphones among university students is on the rise. The popularity of smartphones among university students and their anticipated benefits have encouraged educators to integrate smartphones into their educational practice. The integration of smartphones into educational systems can take various forms. One of the simplest involves the small-scale use of smartphone apps or services to facilitate students' participation in educational settings, such as the use of WhatsApp to facilitate learner participation in educational settings (Rambe and Bere, 2013). A more sophisticated form of smartphone integration involves the use of smartphone services and apps to replace the traditional classroom with mobile distance learning (Baran, 2014; Short et al., 2014; Vázquez-Cano, 2014).

Smartphones are very popular among university students all over the world (Echenique et al., 2015; Gosper et al., 2014; Almisad, 2015; Al-Emran et al., 2016; Briz-Ponce et al., 2017; Gasaymeh, 2018). However, Arab youths have found that

smartphones and smartphone apps have unique advantages for them because they enable them to express their opinions on social, political, educational and civic matters without fear (Kaposi, 2014). For instance, one of the most popular uses of smartphones among Arab youth is to access social media (Hamade, 2013; Gasaymeh, 2017). Furthermore, ownership of high quality smartphones is a status symbol among people in developing countries (Alanazi, 2014).

In Kuwait, the researchers in the present study noted frequent complaints from university educators related to students' use of smartphones during classes. Banning the use of smartphones during classes was described by a Kuwaiti faculty member as "swimming against the current". However, in Kuwait, there is increasing interest in integrating digital technologies to support and enhance higher education. This interest is evident in the establishment of university departments and centres that work to facilitate the integration of digital technologies in education. In addition, Kuwaiti faculty members are constantly encouraged by university administrators to integrate digital technologies into their educational practice.

Based on the above discussion, several factors indicate that the integration of smartphones in higher education institutions in general, and in developing countries in particular, would be of benefit. These factors include the popularity of smartphones among university students, the increasing educational capabilities of smartphones, the promising outcomes from educational projects that have involved the use of smartphones, the desire of developing countries to enhance their higher education outcomes through the integration of digital technologies, and the particular advantages offered by the use of smartphones in higher education in developing countries.

However, students play an integral role in the process of the smartphone integration in higher education. Therefore, assessing the extent of university students' acceptance of the use of smartphones in their learning, and understanding the factors that influence their acceptance, are important for the successful integration of smartphones in higher education. Understanding the extent of students' access to smartphones, the nature of their use of smartphones, and the factors that could influence their acceptance of the academic use of smartphones, should inform policy and practice regarding their integration in higher education settings.

2 Theoretical framework

Several models have been used to examine potential adopters' acceptance and use of particular technologies. The technology acceptance model (TAM) (Davis, 1986) was one of the earliest. The TAM assumes that an individual's attitude toward using a technology will define his/her actual use of that technology, and that an individual's perceptions of the usefulness and ease of use of a technology will shape his/her attitudes toward using it. TAM was subjected to several revisions so that it could be used to acquire an enhanced understanding of individuals' acceptance of, and use of, particular technologies. For instance, an extended version of TAM (TAM2) (Venkatesh and Davis, 2000, p.188) was developed in which the attitude variable was replaced with behavioural intention. In TAM2, the individual's behavioural intention to use a technology was assumed to be directly influenced by subjective norms, in addition to the individual's perceptions of the usefulness and ease of use of the technology. Furthermore, TAM2 assumes that individuals' perceptions of the usefulness of a technology are directly and indirectly

influenced by a set of variables including: subjective norms, voluntariness, image, job relevance, output quality, result demonstrability, and experience.

In another model, Venkatesh et al. (2003) developed the unified theory of acceptance and use of technology (UTAUT). UTAUT proposes that four main factors, performance expectancy, effort expectancy, social influence and facilitating conditions, determine people's intentions to use a technology and their usage behaviour. Only the facilitating conditions factor is a direct determinant of usage behaviour. Moreover, UTAUT proposed that gender, age, experience and voluntariness of use moderate the influence of the four key constructs of the intentions to use and usage behaviour of a technology. In UTAUT, performance expectancy is defined as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al., 2003, p.447). Effort expectancy is defined as "the degree of ease associated with the use of the system" (Venkatesh et al., 2003, p.450). Social influence is defined as "the degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh et al., 2003, p.451). Facilitating conditions are defined as "the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003, p.453).

Studies have employed other factors to examine individuals' acceptance of different types of technologies. Extended versions of technology acceptance models have been used to examine people's acceptance of new technologies. Self-efficacy is a factor that has been commonly used to extend different technology acceptance models. For instance, studies have found that self-efficacy has direct and indirect influences on users' acceptance of different uses of smartphones (Jeon and Park, 2015; Lu et al., 2015). Self-efficacy can be defined as "an individual's beliefs about his or her abilities to successfully execute a specific task" (Porter et al., 2003, p.133). Social cognitive theory emphasises the role of the individual's self-efficacy in determining his/her behaviour (Bandura, 1993).

Another factor that might have an effect on individuals' acceptance of the use of technologies is anxiety. The concept of technology anxiety has been frequently used to extend different technology acceptance models (Seliaman and Al-Turki, 2012). For instance, studies have found that technology anxiety has influenced users' perceptions of different uses of smartphones (Seliaman and Al-Turki, 2012; Yang and Forney, 2013). Anxiety in relation to the use of a technology can be defined as a person's apprehension, or even fear, when she/he is faced with the prospect of using that technology (Venkatesh, 2000). Self-efficacy and anxiety have been examined as factors that might influence users' acceptance of technology in a study that aimed to provide a unified view of technology acceptance – that is, UTAUT (Venkatesh et al., 2003).

The present study examined Kuwaiti university students' acceptance of the integration of smartphones in their learning. Students' attitudes toward the integration of smartphones in their learning were used to reflect their acceptance of such use of smartphones. Students' attitude toward the use of a technology is a significant predictor for their acceptance and actual use of that technology (Davis, 1986; Venkatesh, 2000). Attitude was defined as "a person's general favourableness or unfavourableness toward some stimulus object" (Fishbein and Ajzen, 1975, p.216). In addition, the study examined the potential influence of the four main constructs of UTAUT (namely performance expectancy, effort expectancy, social influence and facilitating conditions), as well as self-efficacy and technology anxiety, on students' acceptance of the integration

of smartphones in their learning. Smartphones are not officially integrated into Kuwaiti students' formal learning. Therefore, university students' attitudes toward the integration of smartphones in their learning, and the factors that might influence those attitudes, are important matters to consider in order to inform future practice and policy related to the use of smartphones to support university students' learning.

3 Literature review

Several studies have examined smartphone possession and usage among university students. For instance, in the USA, Chen and Denoyelles (2013) examined students' use of their mobile devices for personal and educational purposes. One thousand and eighty-two students completed a questionnaire. The results showed that the great majority of the participants (91%) reported owning smartphones. Moreover, the majority of participants reported that they used their mobile devices frequently for checking social networking sites, listening to music, and playing games. The students reported less use of their mobile devices for academic purposes. The most common academic-related apps among students were: apps used by the university for educational and administrative purposes; apps for education (e.g., Flash Cards and Khan Academy); book apps (e.g., CourseSmart and Inkling), reference apps (e.g., Dictionary, Wikipanion); and productivity apps (e.g., Evernote and Dropbox). In addition, the students reported frequent use of information searching and web browser apps (e.g., Google and Safari).

In Saudi Arabia, Alfawareh and Jusoh (2014) examined smartphone use among university students. The participants were 324 university students. The researchers used a questionnaire to collect data. The results showed that the great majority of participants owned smartphones. For personal and social purposes, the students reported using their smartphones to make phone calls, to access the internet, and to take pictures. For academic purposes, the majority of participants had used their smartphones to access their academic portals and to download class-related educational materials. However, the participants reported limited use of smartphones to access the university learning management system, to take notes in the classroom and to record class lectures.

In Bangladesh, Hossain and Ahmed (2016) examined university students' use of smartphones for academic purposes. Three hundred and sixteen students completed a questionnaire. The great majority of participants reported using their smartphones on a daily basis to access the internet. The most common types of websites accessed were academic, news, and social networking sites. For academic purposes, most participants reported using their smartphones to read educational articles, to watch educational videos, and to record class notes. The great majority of the participants agreed that the use of smartphones for educational purposes would be useful for facilitating their learning, saving time, increasing their efficiency, improving their skills, and finding educational information. The participants believed that using smartphones made it easier for them to access educational content and to participate in class discussions. In addition, they believed that the use smartphones for academic purposes had improved their knowledge and increased their motivation to study. In another study that was conducted in two different cultures to examine students' attitudes toward the use of mobile devices in their learning, Viberg and Grönlund (2013) used a questionnaire instrument to collect data from 345 in China and Sweden. The results showed that the students from the two cultures had very positive attitudes toward the use of mobile devices in their learning.

The participants appreciated the personalised, authentic, and collaborative learning experiences facilitated by the use of mobile devices.

However, not all studies have reported positive attitudes among students toward the use of smartphones for educational purposes. For instance, Tossell et al. (2015) examined undergraduate students' perceptions of the use of smartphones in their learning. Twenty-four students participated in the study, which lasted for one year. The participants were not smartphone users before the study. They were given smartphones to use during the study. The data collection instruments were pre- and post-survey questionnaires and the logged data on their phones. The results showed that the students used their smartphones on a daily basis for personal and academic purposes. They used their phones more frequently for personal purposes than for academic purposes. There were significant differences in students' perceptions of the use of smartphones to support their learning before and after the study. The data collected from the first questionnaires showed that the students had favourable attitudes toward the use of smartphones for educational purposes. However, after their actual use of smartphones of one year, they expressed negative attitudes toward the use of smartphones for educational purposes. The participants believed that the smartphones had distracted them from their study, and that smartphones had not helped them in their tests and homework, and had not enabled them to obtain higher grades.

Other studies have employed different models to examine university students' adoption of smartphones for personal purposes. For instance, Pan et al. (2013) used an extended version of TAM to investigate college students' adoption of smartphones and the factors that might influence their adoption. Four hundred and two Chinese college students completed a questionnaire. The results showed that students' attitudes toward the use of smartphones were significantly influenced by the main factors of TAM: perceived ease of use and perceived usefulness. Furthermore, Chinese students' attitudes toward the use of smartphones were significantly influenced by social factors, entertainment utility and the compatibility of their phones. In another similar study that used a different adoption model, Kim (2014) investigated the factors encouraging smartphone adoption among Korean college students. The researcher used an adoption model that was developed based on TAM and UTAUT. One hundred and fifty-three students completed a questionnaire. The results showed that ease of use, usefulness, playfulness, and relationship all had a significant influence on participants' attitudes to smartphone adoption. Moreover, participants' attitudes to smartphone adoption and their perceptions of smartphones' usefulness had a significant influence on their intentions to use smartphones.

Other studies have employed different adoption models to examine university students' adoption of smartphones for academic purposes. For instance, Ahmed et al. (2017) used an extended version of TAM to examine university students' intention to use smartphones for academic purposes. A group of university students from public universities in Malaysia and Nigeria completed a questionnaire. The results showed that students' intentions to use smartphones for academic purposes were influenced by their attitudes toward the use smartphones, social influences and perceived usefulness. In addition, students' attitudes toward the use of smartphones for academic purposes were influenced by their perceptions of smartphones' usefulness and their self-efficacy.

Shin et al. (2011) used a modified UTAUT to examine users' intentions to use smartphones as a ubiquitous learning tool. Two hundred and fifteen students participated in the study. The students were from ten universities in South Korea that had employed

smartphones to access learning services. The results showed that students' continued intentions to use smartphones as a ubiquitous learning tool were directly and indirectly influenced by: the external factor of familiarity; perceived usability factors including perceived usefulness and perceived ease of use; and quality factors including perceived content quality and perceived service quality. In addition, confirmation and satisfaction in relation to smartphone adoption influenced users' intentions to use smartphones as a ubiquitous learning tool.

The studies discussed above show that university students commonly use their smartphones for personal and academic purposes. However, there were variations in the extent of students' use of smartphones in their personal and educational lives. In addition, there were variations in their acceptance of the use of smartphones in their learning, and variations in the factors that influenced their acceptance. The current study aimed to examine female Kuwaiti university students' acceptance of the use of smartphones in their learning, and the factors that potentially shaped their acceptance.

4 Methodology

The study used a quantitative approach. A cross-sectional questionnaire was used to collect data from participants. The questionnaire collected data regarding female Kuwaiti university students' acceptance of the integration of smartphones in their learning.

4.1 Instruments

The data collection tool was a questionnaire with two parts. The first part collected data regarding participants' demographic characteristics, their use of digital technologies, and their use of smartphones. The second part recorded participants' responses to questions about seven scales, namely performance expectancy, effort expectancy, social influence, facilitating conditions, self-efficacy, anxiety, and attitude. The questionnaire instrument was developed based on previous studies (Venkatesh et al., 2003; Sundaravej, 2010). The validity of the instrument was checked by a panel of experts who were faculty members from the college of education at a university in Kuwait. They reviewed the questionnaire instrument. The reliability of the questionnaire instrument was checked by computing the Cronbach's Alpha for each scale in the questionnaire. The values of Cronbach's Alpha were high and appropriate for the purposes of the study. Table 1 shows the results of the reliability analysis of the questionnaire instrument.

Table 1 Summary of reliability analysis

Scale	*Cronbach's alpha*
Performance expectancy scale	.85
Effort expectancy scale	.82
Social influence scale	.70
Facilitating conditions scale	.79
Self-efficacy scale	.70
Anxiety scale	.82
Attitude scale	.86

4.2 Participants

The participants were female undergraduates from six classes in a college of basic education. All the students in these classes were invited to participate in the study. The students who gave their consent were asked to complete a questionnaire during a class meeting. The number of students in the six classes was 152; all these students completed the questionnaire. Table 2 shows the frequency distributions of participants' demographic data including age, major, and academic year.

Table 2 Descriptive summary of participants' ages, majors and academic years

	Category	*Frequency*	*Per cent*
Age	18–20	15	9.9
	20–25	113	74.3
	26–30	15	9.9
	31–35	5	3.3
	36–40	2	1.3
	> 40	2	1.3
Major	Computer Science	62	40.8
	Educational Technology	31	20.4
	Physical Education	4	2.6
	English Language	7	4.6
	Islamic Education	15	9.9
	Electrical Education	7	4.6
	Math Education	6	3.9
	Arabic Language	5	3.3
	Art Education	1	.7
	Music Education	1	.7
	French Language	1	.7
	Science Education	2	1.3
	Internal Design Education	1	.7
Academic year	1	0	0
	2	13	8.6
	3	22	14.5
	4	76	50.0
	5	40	26.3

Table 2 shows that the great majority of the participants (74.3%; n = 113) were between the ages of 20 and 25, they were majoring in either computer science (40.8%; n = 62) or educational technology (20.4%; n = 31), and they were in either their fourth (50%; n = 76) or fifth (26.3%; n = 40) academic year.

4.3 Study settings and procedure

Data was collected in the first semester of the 2017/2018 academic year. The data was collected from the six classes in the college of basic education using a paper-based

questionnaire. The courses were selected since they were convenient to access by the researchers. The use of smartphones was not required in these courses. The researchers collected the data by handing the questionnaires to the students during one class meeting and the students completed and returned the questionnaires during the same class meeting.

4.4 Data analysis

Students' responses to the questionnaire were analysed using the SPSS 16.0 software package. Descriptive analysis and inferential statistics were used to analyse students' responses. The analysis included finding frequency distributions, means, and standard deviations. Frequency distributions were calculated for students' demographic data, their use of digital technologies, and their ownership and use of smartphones and smartphone apps. Means and standard deviations were computed for each scale in the questionnaire. The inferential statistics used included correlation and regression analyses. Pearson's product-moment correlation coefficients were computed to determine the direction and strength of the relationships between the examined variables that represented the questionnaire's sub-scales. Regression analysis was conducted to examine the relationships between the students' acceptance of the integration of smartphones in their learning as indicated by their attitudes toward the use of smartphones in their learning, and the examined factors, namely, performance expectancy, effort expectancy, social influence, facilitating conditions, self-efficacy, and technology anxiety. Before conducting the regression analysis, the scoring of the items on the anxiety scale was reversed since they were expected to have negative relations with students' attitudes toward the use of smartphones in their learning. In addition the assumptions of absence of multicollinearity, normality, linearity and homoscedasticity of residuals were verified before the regression analysis was conducted.

5 Results and discussion

5.1 Students' use of digital technologies

Data regarding participants' use of different types of digital technologies were collected. These digital technologies included smartphones, laptop computers, desktop computers, and tablet computers. These technologies were included in the questionnaire since they were the most popular technologies among students based on the researchers' observations.

Table 3 shows that All participants (100%, $N = 152$) reported using smartphones for personal purposes. The second-most popular type of digital technology used for personal purposes was laptop computers, and 44.7% ($n = 68$) of the participants reported using laptop computers for personal purposes. However, there was a major decline in the number of students who reported using other digital technologies (i.e., desktop computers and tablet computers). Similar to their use of smartphones for personal purposes, the majority of participants (90.1%, $n = 137$) reported using smartphones for educational purposes. However, the use of laptop computers for educational purposes was more common than the use for personal purposes, and about three-quarter of the participants (73%, $n = 111$) reported using laptop computers for educational purposes. Similar to their use for personal purposes, the educational use of desktop computers and tablet computers was not common among participants. The popularity of the use of laptop computers for educational purposes can be attributed to the participants' majors. For

instance, the students who were majoring in Computer Science and Educational Technology needed to use computers to do some educational tasks that smartphones could not support, such as computer programming. Laptop computers have bigger screens, keyboards, and storage capacities than smartphones. In addition, laptops usually have more powerful processors than smartphones. Such characteristics of laptop computers made them the appropriate devices for the students to accomplish complicated educational tasks.

Table 3 Descriptive summary of participants' use of digital technologies

Variables	*Category*	*Frequency*	*Per cent*
Types of digital technologies Used for Personal Purposes	Smartphone	152	100
	Laptop computer	68	44.7
	Desktop computer	5	3.3
	Tablet computer	10	6.6
Types of digital technologies Used for Educational Purposes	Smartphone	137	90.1
	Laptop computer	111	73
	Desktop computer	12	7.9
	Tablet computer	4	2.6

Data regarding participants' ownership of smartphones and number of years of experience with smartphones were collected. The data was related to participants' ownership of a smartphone, the type of smartphone owned, the number of smartphones owned, and the number of years of experience with smartphones (Table 4).

Table 4 Students' ownership of smartphones

Variables	*Category*	*Frequency*	*Per cent*
Own a smartphone	Yes	152	100
	No	0	0
Type of smartphone	Apple iPhone	125	82.2
	Samsung Galaxy/Samsung Note	19	12.5
	Huawei	7	4.6
Number of smartphone	1	77	51.0
	2	60	39.7
	3	10	6.6
	4	3	2.0
	5	1	.7
	More than 5	0	0
Number of years of experience with smartphones	1–5	29	19.1
	6–10	111	73.0
	11–15	6	3.9
	>15	1	.7

All the participants (100%, $N = 152$) reported owning a smartphone. The Apple iPhone was the most popular brand among participants. The great majority of the participants (82.2%, $n = 125$) reported possessing Apple iPhones. About half of the participants (49%, $n = 74$) reported possessing more than one smartphone. The participants had long

experience with the use of smartphones, and about three-quarters (73%, *n* = 111) reported having six to ten years' experience. The findings regarding smartphones' popularity among university students is consistent with the previous literature and the statistics of mobile subscription rates at the country level. For instance, Almisad's (2015) study (*N* = 171) found that 99.4% of the participating university students reported owning a smartphone and most owned more than one. In addition, in Kuwait there were 133.07 mobile-cellular telephone subscriptions per 100 inhabitants (ITU, 2016). A possible explanation for participants' ownership of more than one smartphone is that they used one phone for social interaction and another one for academic purposes.

Data regarding the extent of participants' use of smartphone apps for personal and educational purposes were collected. The data was related to participants' frequency of use of smartphones for personal purposes and for educational purposes, and apps used for personal purposes and for educational purposes (Table 5).

Table 5 Extent of students' use of smartphones

Variables	*Category*	*Frequency*	*Per cent*
Frequency of using smartphone for personal purposes	Less than once a month	21	13.8
	Once a month	2	1.3
	Several times a month	3	2.0
	Once a week	3	2.0
	Several times a week	4	2.6
	Once a day	4	2.6
	Several times a day	24	15.8
	Once an hour	0	0
	Several times an hour	27	17.8
	All the time	63	41.4
Frequency of using smartphone for educational purposes	Less than once a month	19	12.5
	Once a month	8	5.3
	Several times a month	16	10.5
	Once a week	12	7.9
	Several times a week	41	27.0
	Once a day	6	3.9
	Several times a day	28	18.4
	Once an hour	1	.7
	Several times an hour	6	3.9
	All the time	15	9.9
The five apps that are most commonly used for personal purposes	WhatsApp	125	82.2
	Snapchat	111	73
	Instagram	94	61.8
	Twitter	69	45.4
	YouTube	36	23.7
The five apps that are most commonly used for Educational purposes	myU	64	42.1
	YouTube	46	30.3
	Edmodo	45	29.6
	Google Chrome	31	20.4
	Google classroom	22	14.5

The great majority of participants (77.6%; n = 118) reported that they used their smartphones for personal purposes at least once a day. The percentage of participants who reported using their smartphones for educational purposes at least once a day dropped to 36.8% (n = 56). However, the great majority of participants (71.7%; n = 109) reported using their smartphones for educational purposes at least once a week.

The most popular smartphone apps that the students used for personal purposes were social media apps. The most popular was WhatsApp followed by Snapchat. The findings aligned with the results of previous studies that revealed university students' heavy use social media sites such as WhatsApp to share different forms of media and to keep in touch with family and friends (Gasaymeh, 2017). In addition, Knight-McCord et al. (2016) found that Instagram and Snapchat were the social media sites that college students used the most. Alhabash and Ma (2017) found that Instagram, followed by Snapchat, were the most common social media apps among university students. Knight-McCord et al. (2016) reported that university students most frequently used social networking sites that allowed them to post pictures and videos.

The most popular smartphone app that students in this study used for educational purposes was myU, followed by YouTube and Edmodo. The results indicate that students' intensity of using smartphone apps for educational purposes is directly related to faculty members' use of these apps. MyU, Edmodo, and Google Classroom are educationally-related apps, and the integration of such apps in the educational process requires the participation of students and faculty members. Only one type of social media app was among the top apps that the students used for educational purposes, and that was YouTube. YouTube allows users to publish and share educational videos. Some YouTube videos are valuable for instructional purposes (Snelson, 2015). Students can often learn from educational videos on YouTube more effectively that they can from paper-based educational materials, since videos allow them to use multiple senses (Oddone, 2011). Nowadays students rely on electronic educational materials rather than printed ones (Kumah, 2015), and this explains their reliance on their smartphones to search and access educational material.

The finding regarding students' use of smartphone apps aligns with the findings of previous studies that have shown that university students use their smartphone apps for personal and educational purposes in different parts of the world (Chen and Denoyelles, 2013; Alfawareh and Jusoh, 2014; Hossain and Ahmed, 2016). The results suggest that the students were familiar with the use of smartphones and smartphone apps for personal and educational purposes. The popularity of smartphones among participants and their experience of using smartphones suggest that higher education practitioners could increase their reliance on smartphones in the educational process, and that the use of smartphones for educational purposes does not need training and adaptation for students.

5.2 Participants' perceptions and acceptance of the use of smartphones for educational purposes

Students' perceptions and acceptance of the use of smartphones for educational purposes were examined using seven scales, namely performance expectancy, effort expectancy, social influence, facilitating conditions, self-efficacy, anxiety, and attitude (Table 6).

Table 6 Descriptive statistics of participants' responses to scales for measuring perceptions and acceptance of smartphones for educational purposes

Scale	*M*	*SD*
Performance expectancy scale	3.96	.71
Effort expectancy scale	4.24	.64
Social influence scale	3.45	.65
Facilitating conditions scale	4.00	.66
Self-efficacy scale	3.77	.65
Anxiety scale	2.45	.89
Attitude scale	3.82	.79

Participants responded most positively to the effort expectancy scale (M = 4.24, SD =.64), and least positively to the technology anxiety scale (M = 2.45, SD =.89). Participants agreed that they required facilitating conditions to use smartphones in their education (M = 4.0, SD =.66), that they perceived smartphones to be useful tools that could positively affect their learning, participants responded positively to the effort expectancy scale (M = 3.96, SD =.71). They were confident in their ability to successfully use their smartphones in their learning, participants responded positively to the self-efficacy scale (M = 3.77, SD =.65). However, the students had close to neutral perceptions about the existence of social pressure to use smartphones in their education (M = 3.45, SD =.65). The participants had positive attitudes toward the use of smartphones in their learning (M = 3.82, SD =.79). Students' positive attitudes suggest that they would accept the use of smartphones to support their learning. The students based their perceptions and attitudes toward the use of smartphones in their learning on their informal and personal experiences of using smartphone apps. Students' positive perceptions and attitudes toward the use of smartphones in their learning can be related to the findings of previous sections that show that they were familiar with smartphones. Most of them had more than five years of experience, and they used smartphones for personal and academic purposes. Universities should exploit this acceptance by formally integrating smartphones to support teaching and learning. Students' positive perceptions of and attitudes toward the use of smartphones in their learning aligns with the findings of similar studies (Viberg and Grönlund, 2013; Hossain and Ahmed, 2016) and contradicts others (Tossell et al., 2015).

5.3 Relationships between students' perceptions of and attitudes toward the use of smartphones to support their learning

The Pearson's correlation coefficients were computed to examine the strength of the associations between the examined variables: performance expectancy, effort expectancy, social influence, facilitating conditions, self-efficacy, anxiety, and attitudes. The values of the correlation coefficients are presented in Table 7.

Table 7 Bivariate correlations between perceptions and attitudes in relation to the use of smartphones to support students' learning

	Attitude	*Performance expectancy*	*Effort expectancy*	*Social influence*	*Facilitating conditions*	*Self-efficacy*	*Anxiety*
Attitude	1.00						
Performance expectancy	.58*	1.00					
Effort expectancy	.46*	.39*	1.00				
Social influence	.38*	.33*	.25*	1.00			
Facilitating conditions	.51*	.48*	.43*	.35*	1.00		
Self-efficacy	.26*	.26*	.11	.22*	.32*	1.00	
Anxiety	–.24*	–.24*	–.19*	–.09	–.29*	–.18*	1.00

Note: * $p < .05$.

Table 8 shows that the correlation tests indicated that there were significant relationships between all the examined pairs of variables, except between effort expectancy and self-efficacy and between anxiety and social influence. All the relationships were positive except the relationships between anxiety and the rest of variables.

Table 8 Multiple regressions on dependent variable (students' attitudes toward the use of smartphones to support their learning)

	B	*SE B*	*Beta*	*p*
Constant	–.57	.45		.21
Performance expectancy	.38	.08	.34	.00*
Effort expectancy	.25	.09	.20	.01*
Social influence	.18	.08	.14	.04*
Facilitating conditions	.21	.09	.18	.03*
Self-efficacy	.06	.08	.05	.42
Anxiety	.04	.06	.05	.45

Note: $R^2 = .46$ ($p<.05$).

In order to determine the strengths of the relationships between the dependent variable (students attitudes toward the use of smartphone to support their learning) and the independent variables (performance expectancy, effort expectancy, social influence, facilitating conditions, self-efficacy, anxiety), regression analysis was conducted (Table 8).

The findings from the regression analysis show that the six independent variables (performance expectancy, effort expectancy, social influence, facilitating conditions, self-efficacy, anxiety) explained 46% of the variance of students' attitudes toward the use of smartphone to support their learning ($R = .675$, $F(6,145) = 20.22$, $p<.05$). The standardised beta coefficient can be used to compare the strength of the effect of each individual independent variable on the dependent variable. The results showed that only four independent variables: performance expectancy (*Beta* = .34; $p = .00$), effort

expectancy (*Beta* = .20; *p* = .01), facilitating conditions (*Beta* = .18; *p* = .03), and social influence (*Beta* = .14; *p* = .04) were individually significant in predicting students' attitudes toward the use of smartphones to support their learning, and they had the highest effect on students' attitudes. The other two independent variables, self-efficacy (*Beta* = .05; *p* = .42), and anxiety (*Beta* = .05; *p* = .45) made small contributions to predicting students' attitudes toward the use of smartphones to support their learning.

The results aligned with UTAUT's assumptions that performance expectancy, effort expectancy, social influence, and facilitating conditions influence users' acceptance of a technology. However, the low value of the explained variance in students' attitudes toward the use of smartphones to support their learning suggests that there are factors other than those examined in this study that affect students' attitudes toward the use of smartphones to support their learning.

Previous studies that used different technology acceptance models found that users' acceptance of the use of smartphones for educational purposes was significantly influenced by perceived ease of use and perceived usefulness (Shin et al., 2011; Pan et al., 2013; Kim, 2014) and social influence (Pan et al., 2013). However, that self-efficacy had an insignificant influence is inconsistent with the findings of other studies that showed that students' attitudes toward the use smartphones to support their learning were significantly influenced by their level of self-efficacy (Ahmed et al., 2017). The characteristics of the current study, in terms of the target population and educational environments, might have had an effect on the findings.

Identifying students' extent of access to a specific technology, their preferences regarding the use of the technology, their perceptions of and attitudes toward the use of the technology, and their perceptions regarding the educational value of the technology, have been found to influence policy and practice regarding the integration of such technology (Margaryan et al., 2011).

6 Conclusion and recommendations

Kuwaiti university students use their smartphones in their daily lives. They are familiar with the use of smartphones and they have considerable experience with the use of smartphones. However, the use of smartphones for educational purposes is less common. The results show that female Kuwaiti university students had favourable attitudes toward the use of smartphones to support their learning. Their attitudes were positively related to their positive perceptions of smartphones' usefulness and ease of use, the influence of others, the presence of facilitating conditions, their self-efficacy, and their low anxiety regarding the use of smartphones.

However, smartphones' usefulness and ease of use, the presence of facilitating conditions, and social influence were the only factors that had significantly predicted Kuwaiti university students' acceptance of the use of smartphones in their education. The results align with the assumptions underlying UTAUT and show that potential users' acceptance of a technology is associated with their perceptions of the technology, the presence of facilitating conditions to use the technology, and the positive social influences regarding its use. The results support the validity of the UTAUT across cultures, as the four main factors of UTAUT had a significant influence on students' acceptance of the use of smartphones among Kuwait university students.

The findings of the current study can be used to help practitioners in their work to improve the implementation of technology in higher education, particularly smartphones. In addition, faculty members can find practical value and implications in the current study in relation to the inclusion of smartphone use in their educational practice. Higher education practitioners should use smartphones to support students' learning in an effective way that requires little effort from the students. The use of smartphones to support students' learning should be accompanied with work on improving the opinions of people who might influence the students' attitudes and behaviours regarding the use of smartphones for educational purposes. Furthermore, universities should provide ongoing support to students by providing services such as technical assistance, free Wi-Fi, free electrical outlets and safe facilities for charging phones.

Future research could rely on the finding of this study through utilising extended versions of UTAUT to investigate other factors that might affect students' acceptance of the integration of Smartphones in their learning. Identifying other factors that would affect students' acceptance of the integration of Smartphones in their learning would help in designing and implementing the use of Smartphones in higher education. In order to the enhance generalisability of the results, future research should consider having a large sample of participants with various demographic characteristics.

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