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Use of smartphone apps among library and information science students at South Valley University, Egypt

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Abstract

Purpose – The purpose of this study is to investigate the use patterns and ownership of smartphone apps among students at the Department of Library and Information Science (DLIS) at the South Valley University (SVU), Egypt. This study may help faculty members and students, as well as DLISs in general and SVU's DLIS, in particular, to understand the nature and purpose of such use.

Design/methodology/approach – This study used quantitative research methodology in the form of a survey, which was undertaken from February to March 2015. The survey instrument was a self-administrated questionnaire, with a response rate 82.7 per cent (441/533).

Findings – The findings of this study showed that smartphone users (82.7 per cent) at SVU's DLIS tended to be junior females. Smartphone non-users (17.3 per cent) tended to be also young females but primarily sophomores. The highest percentage of smartphone users had been using smartphones for four to five years, and the largest number of students was described to be advanced users who heard first about these mobile devices through friends and the Web. Most users had 21 to 25 apps. Social apps were the most popular and included Facebook, e-mail and Twitter. For professional purposes, students used smartphones more for communication purposes than learning purposes. Apps related to educational purposes included Google Mobile, Facebook, e-mail, Twitter, YouTube and Wikipedia Mobile. Students perceived most apps to be easy to use and useful to them. There were a number of uses for socializing including messaging, following the news and playing games. Students had mainly positive attitudes towards apps with a few negative concerns. Almost all students confirmed that they trust most apps. Barriers related to the use of apps included training and lack of awareness. Further research may be needed to specify the relationship between the students' use of these apps and their academic performance. The main tasks done on smartphone devices were mainly for socializing. Students indicated that popular tasks and activities, such as sending and receiving messages, following the news, making communications, making chat, making friends, finding specific information, finding general information, making discussion groups, playing games, completing class assignments, checking materials related to courses, doing business, seeking jobs, watching movies, listening to music and accessing library services are important tasks accomplished by them through the use of these devices. The current study indicated very positive attitudes towards the use of these apps. Student at least agree with the statement that smartphone apps allow for easy dissemination of information, provide too much information, increase the speed of finding information, help communication, convenient, secure, build confident and reduce paper use. However, a large number of students also at least agree with the statement that these apps are time consuming, intimidating, addictive, violate privacy, require high language and technical skills, harmful and frustrating. Almost all students confirmed that they are at least trustful in some apps, such as WhatsApp, e-mail, YouTube, Facebook, Flickr, Twitter and Viber. A large number of smartphone users surveyed in this study have been described to make excessive usage of social apps, such as communication apps, messaging/texting apps

and social networking sites, which were at the forefront of use. Additionally, a large number of them adopted these devices, especially for communication purposes. The most used apps were Facebook, e-mail, Twitter, WhatsApp, YouTube and Viber. For professional purposes, students used smartphones more for communication purposes than learning purposes. However, some of the students were using some of apps related to educational purposes, such as Google mobile, Facebook, e-mail, Twitter, YouTube and Wikipedia mobile but not on a regular basis. Students perceived the use of e-mail app, Google mobile, Facebook app WhatsApp, Kik, Twitter, YouTube, Google maps, Viber, Line, Skype, Tango, Instagram, Flickr and Wikipedia mobile as at least fairly easy to them. Additionally, they perceived the use of e-mail app Google mobile, WhatsApp, Facebook, YouTube, Twitter, Viber, Instagram, Wikipedia mobile, Google maps, Kik, Skype, Line, Tango and Flickr as at least fairly useful to them, especially for the purpose socialization more than learning.

Research limitations/implications – This study focuses only on undergraduate library and information science students belonging to SVU's DLIS, Egypt. Any findings and conclusions resulting from this study are limited in scope to only SVU's DLIS's undergraduate students. The study does not contain a significantly large sample of a population from across Egypt to draw meaningful widespread conclusions indicative of such a larger population.

Practical implications – This study provides valuable insight into the use pattern of smartphones among a very important client group. It may serve as useful input to researchers who are interested in the study of mobile internet technologies (MITs), particularly in the education society.

Originality/value – Being the first study of its kind about university students in Egypt, it is considered a pioneering and a unique study among studies conducted in the field of ICTs and MITs, especially with this category of information users.

Keywords Smartphones, Education, Egypt, College students, Library and information science, Mobile internet technologies, Qena, South valley university

Paper type Research paper

Introduction
Smartphones are one of the most common devices accessed and used by people worldwide. They have become one of the main tools to get quick access to information. A "smartphone is one [of] the most ubiquitous, dynamic and sophisticated trends in communication" (Alfawareh and Jusoh, 2014, p. 321). According to the Radicati Group (2014), a technology market research firm, the number of worldwide mobile users, including both business and consumers, reached 5.6 billion users in 2014, and by the end of 2018, this number is expected to reach over 6.2 billion. "Roughly 84 per cent of the world's population will be using mobile technology by year-end 2018" (Radicati Group, 2014, p. 2).

The value of smartphones is apparent in all aspects of life, particularly in politics and education. This value was clearly expressed, particularly in Egypt, in what is called "The Arab Spring", where such devices were described as being the most important ways of communication among protestors inside and outside Egypt. In this regard, Duffy (2011) confirmed that "The smart phone helped cover the Arab Spring in a way that traditional journalism simply couldn't" (p. 53). In education, sharing the opinion with Chen and Denovelles (2013), the popularity of mobile internet technologies (MITs), such as smartphones, tablets and e-book readers, is noticeably increasing among college students. A significant number of universities are now using mobile technologies and have created mobile-optimized versions of their websites or have built stand-alone apps that can be downloaded from mobile app stores (Rellinger, 2011). Such devices and tools are playing a significant role in the academic life of college students. They help connect

students to each other and to their instructors. Applications (apps) which run on these devices/tools let students consume, discover and create content (Dahlstrom, 2012). Despite the widespread use of smartphones, little is known about the ownership of such devices and their use by the population in general and university students in particular (Mazloomy *et al.*, 2009). Investigating the use of smartphones among students at the university level is very important because they tend to be the first group to use new technology (Emanuel, 2013). The current study investigates the ownership and use of such mobile devices among students enrolled in one of Egypt's library and information science schools.

Purpose and significance of the study
The main purpose of this study is to investigate the use patterns and ownership of smartphone apps among students in library and information science (LIS) at the South Valley University (SVU), Egypt. Previous studies, such as Chiu *et al.* (2015), revealed that there is limited research about the use of MITs by LIS students. The current research, therefore, may help faculty members and students, as well as the discipline in general and SVU's Department of Library and Information Science (DLIS) in particular, to understand the nature and purpose of such use. This study may serve as useful input to researchers who are interested in the study of MITs, particularly in the education discipline.

Statement of the problem
A large number of previous studies showed that smartphones have been mostly used for communication and entertainment (Viticci, 2012). MITs, especially smartphones, have been studied on a large scale, but research about the potential use of these devices among university students, especially at the undergraduate level, has still not gained much attention by researchers, especially in Arab countries, where Egypt is located. More research, therefore, is needed to be conducted on this topic among such users to recognize how and why they use these types of devices.

The objectives of the study
The eight objectives of this study are to:

(1) describe the demographic characteristics of smartphone users and non-users at SVU's DLIS;

(2) describe the features of smartphone apps used by students at SVU's DLIS;

(3) determine the ease and usefulness of using apps by smartphone users at SVU's DLIS;

(4) determine which types of apps smartphone users at SVU's DLIS use most;

(5) determine which apps smartphone users at SVU's DLIS use for education and library-related activities;

(6) determine tasks done on apps by smartphone users at SVU's DLIS;

(7) determine the positive and negative aspects of using apps by smartphone users at SVU's DLIS; and

(8) identify constraints encountered by smartphone users and non-users at SVU's DLIS.

Definitions of terms
Smartphones
According to Alfawareh and Jusoh (2014):

> [A] smartphone is a mobile phone running a complete operating system in a manner similar to a traditional computer, which offers advanced computing abilities and connectivity options. These features enable new kinds of mobile services that in turn shape the usage habits of smartphone users (p. 321).

They are used interchangeably with mobile phones, cell phones and feature phones. All are, to some extent, similar but still different in terms of their capabilities. The smartphone has very advanced capabilities over the other two.

Smartphone applications
Smartphone apps are defined as software applications that run in a mobile phone (encyclopedia2.thefreedictionary.com). These may include games, diaries, planners, maps and more.

Department of library and information science at South Valley University
According to its official website, DLIS was founded in 2003 as the first program, at the bachelor's level, in the field of LIS in Egypt. DLIS builds cadres specialized in LIS to meet the needs of the various sectors, particularly in Upper Egypt. In total, DLIS has 600 undergraduate students, of whom 523 are females and 77 are males. There is one associate professor, three assistant professors, three teaching assistants and seven tutors (DLIS, 2014).

The South Valley University
According to its official website, SVU was established on 2 January 1995 by presidential degree Number 142. It covers a large area in Upper Egypt distributed in three Governorates (Qena, Luxor and the Red Sea) and includes a total of 16 faculties and 1 institute. The main campus of the SVU is located in Qena, which is 609 km south of Cairo, the capital:

> As compared to its weight, SVU is committed to a big social service role in the region of Upper Egypt. SVU is a vibrant, nationally recognized student-centred research institution with an enrolment of 28,173 in the academic year 2013/2014 and has about 1,377 faculty members (SVU, 2014).

The Arab Republic of Egypt (ARE)
Egypt is one of the oldest civilizations, with recorded history dating back to about 4,000 BC. With a total area of about 386,662 square miles and an estimated population of 80,471,869 in 2010, Egypt is situated at the northeast of Africa on the Mediterranean Sea. Egypt is bordered to the west by Libya, to the south by Sudan and to the east by the Red Sea and Israel (Infoplease, 2015).

Study limitation
This study focuses only on LIS students, at the undergraduate level, who attend SVU's DLIS. It does not cover any other disciplines or any other levels. Any findings and conclusions resulting from this study are limited in scope to the studied population. The

study does not contain a significantly large enough sample from across Egypt to draw meaningful widespread conclusions.

Literature review

Despite the extensive use of smartphone devices, little is known about their ownership and use by the general population and especially university students (Mazloomy *et al.*, 2009). The use of such types of mobile devices has largely helped students improve their access to current and reliable information sources:

> Today, mobile phones have features that go far beyond text messaging and voice calls. They include Internet browsing, music (MP3) playback, memo-recording, personal organizer functions, e-mail, bulletin[s], cameras, infrared, and Bluetooth connectivity. However, the ability of mobile phones to offer a range of applications depends on the capability of individual mobile phones and the services available (Anyanwu *et al.*, 2012, pp. 52-53).

This study presents literature related to the use of these devices by university students in reverse chronological order. Most recently, Alfawareh and Jusoh (2014) explored, through a survey approach, trends in the use of smartphones among university students (*n* = 324) at Najran University, Saudi Arabia. Findings revealed that a very large number of students owned smartphones, and the majority of them were using smartphones as a regular mobile phone, as a computer connected to the internet and as a digital camera. Although a very large number (91.7 per cent) of students has used these devices to log in to their academic portal, 67.0 per cent of them never used them to record class lectures and 46.5 per cent had never used them for downloading materials related to class.

Regarding the potential use of smartphone devices for educational purposes, Chen and Denovelles (2013) explored, through an online survey, the access and use of these devices, as well as barriers to the insertion of mobile technologies into the academic sphere. The authors surveyed 809 undergraduate and 133 graduate students at the University of Central Florida (UCF). They found that the ownership of mobile devices by students were primarily small mobile devices, such as iPhone and Android, followed by a mobile tablet, such as as iPad, Android tablet and Kindle Fire, and e-book readers, such as the Kindle. The findings also revealed that students needed more access to academic-friendly devices, such as tablets, and additional support to integrate mobile technologies into learning-related activates. Bomhold (2013) surveyed 75 students enrolled in an introductory class in information literacy at a university in the Southern USA. He reached the conclusion that students used smartphone apps for more than communication and entertainment, as a significant number of them disclosed using apps to find academic information on academic websites using related search engines. White and Mills (2012) surveyed 403 Japanese university students regarding their adoption and use of smartphones, especially for language learning purposes. They found that students were increasingly adopting these mobile devices for personal use but were still reluctant to use them for educational purposes. The study revealed that attitudes towards the use of these devices for learning purposes have become more positive.

Through an online survey, Song and Lee (2012) investigated the ownership of mobile devices (smartphones, tablet PCs and e-readers) among 101 international students enrolled at the College of Business at the University of Illinois. Results revealed that students were interested more in communication but were also using mobile devices to

access social networking sites, search for information and to have fun. Dresselhaus and Shrode (2012) conducted two surveys on the use of smartphones at Utah State University (USU). The first survey concerned the use of mobile devices by USU's students (approximately 25,000 undergraduates and graduates) to determine why they use such devices and their interest in mobile access to library collections and services. The second survey was directed towards librarians to learn about libraries' current and future plans to launch mobile services. Results from the first survey helped to gain insight into where students stand regarding their use of mobile devices for academic activities in general and their desire to access library services and resources in particular. Results from the second survey provided an idea of the extent to which responding libraries offer mobile access, their future plans for mobile implementation and their opinions about how mobile technologies may be useful to library patrons.

Anyanwu et al. (2012) conducted a survey on the potential use of smartphones for research purposes among undergraduate students in two polytechnic libraries in Nigeria. Findings showed that students using the polytechnic libraries were occasionally using their smartphones for research. The findings also revealed that students were pushed to use these mobile devices for various reasons, such as the lack of relevant information sources in libraries, saving time and the cost of travelling to other libraries for research, a low level of satisfaction derived from available resources and the lack of internet facilities in libraries. However, barriers, such as the high cost of downloading some online resources, incompatibility of software/formats of online resources and insecurity of sites which cause damage to phones, were identified as constraints encountered by students when using smartphones.

Uys et al. (2012) assessed the use of smartphone apps, specifically social networking apps, among students at a South African university. They assessed the frequency and intensity of the usage of apps. Findings showed that students spent an average of five hours per day on their smartphones communicating and interacting with others via SNSs and remained online for about 16 hours per day. Students were found to use SNS apps, predominantly for Facebook, Facebook chat and Blackberry Messenger, to update their profiles, chat with friends and look at their friends' profiles and statuses. Through a cross-sectional survey, Jamal et al. (2012) explored the use pattern of smartphones among 120 female medical students at Taibah University, Saudi Arabia. Findings revealed that 53.2 per cent of students used smartphones daily. Only 13.3 per cent of the students using smartphones found that they had a harmful effect on their academic performance. The study concluded that a substantial number of female medical students using smartphones reported possible health hazards, which might affect academic performance. Using a self-administrated questionnaire, Mazloomy et al. (2009) conducted their study on the use of mobile phones with a sample of 309 medical science students at Yazd Medical Sciences University, Pakistan. Findings showed that students mainly used smartphones at home, followed by on the street, in the classroom, while driving, and in the library, respectively. They reported 87.2 per cent use of cell phones at home, followed by on the street (79.6 per cent), in the classroom (37.6 per cent), during driving (18.6 per cent) and in the library (17.8 per cent), respectively. Abdul Karim et al. (2006) explored the use of mobile phone services in the educational environment and the perception of university students towards the use of mobile phones in library and information services. Data were collected from 206 undergraduate students from two academic faculties in a Malaysian public university. Findings showed that students'

perceptions on the application of wireless hand services in the context of library and information services were very positive.

Regarding the pattern of smartphone use by LIS students, Adomi (2006) used a systematic random sampling technique to investigate the use patterns of these mobile devices among 110 students at the Department of Library and Information Science, Delta State University, Nigeria. Findings revealed that a majority of the students were using apps mainly for communicating with their parents/relatives/friends, as well as for sending and receiving messages. Family matters, followed by finance and academic matters, constituted the primary conversation topics on the smartphones. Frequent network/call failure, followed by the high cost of recharge cards/airtime, limited coverage areas and interconnectivity problems were the most significant challenges when using smartphone apps.

Academic use of smartphones
According to Rhema and Sztendur (2013), "Mobile phones are seen as a key means for improving access to education" (p. 215). Mobile devices in general and smartphones in particular establish a potential for a ubiquitous learner engagement that is often referred to as "learn anything at anytime and anywhere" (Sakamura and Koshizuka, 2005). There are a number of ways to learn to use mobile technologies, leading to the description of mobile technologies as a gateway to tools and resources. Such technologies make learning more personalized and connect the teacher with his/her students and reduce any gaps that may arise between them.

Advantages of smartphones in education
According to Bae and Kim (2014), the biggest advantage of the use of smartphones in education is that learning can be accomplished anywhere and anytime. It can create an effective learning environment for instructors and students. Compared to other mobile devices, such as tablets and laptop computers, smartphones have the following advantages:

- They are small and lightweight, thus can be easily carried by anyone, anytime and anywhere.
- They are not too expensive because of fewer materials that are associated with their use.
- They run on smaller amounts of power than other devices, such as laptops and desktop computers.
- They have several connectivity methods, such as Bluetooth and/or internet connectivity.
- They are engaging, so learning can last for a long time (Ecycle Best, 2015).

Student use of smartphone apps
"College students are more likely to be innovators or early adopters of new information technologies than the general population" (Nelson, 2006, p.6). Smartphone apps enable students to access a variety of electronic media and information in a convenient way. According to Seilhamer *et al.* (2013), there are significant factors that make mobile learning more attractive to college students, such as convenience, flexibility, engagement and interactivity. Results from the ECAR research study on students

suggest that many undergraduate students bring their own digital devices to college, favouring small and portable ones, such as smartphones and tablets (Dahlstrom, 2012). Mobile technologies are playing an increasingly important role in the academic lives of college students. Mobile devices, such as smartphones, tablets and e-book readers, connect users to the world instantly, heightening access to information and enabling interactivity with others. According to Chiu *et al.* (2015), the following are the most unique benefits of using mobile technologies for teaching and learning:

- They are relatively inexpensive, easily carried and very mobile.
- They allow students to learn at their convenient time "anywhere and at any time", without the restrictions of the physical classroom.
- They let students interact virtually and this could encourage them to develop their social skills.
- They are a great challenge for libraries, as they provide libraries with various opportunities to extend their collections and services by enabling access to their end-users in a most convenient way.

With the help of mobile phone-enabled technologies, smartphones are considered to be the most appropriate and suitable ways and means to host all Web applications in a pocket-sized computing device, which can be easily carried and accessed by the user. However, according to Baghianimoghadam *et al.* (2013), mobile phones have severe adverse effects on the academic achievement of students. Smartphones may be used in the classroom to engage students, access real-time feedback and answer questions in an anonymous way.

Research questions

This study was designed to answer the following eight research questions:

RQ1. What are the demographic characteristics of smartphone users and non-users at SVU's DLIS?

RQ2. What are the features of the use of smartphones by students at SVU's DLIS (period of use, experience, first hearing about apps, location, the number of smartphones owned, smartphone brand and the number of apps accessed)?

RQ3. Which types of apps do students at SVU's DLIS use most?

RQ4. Which apps do students at SVU's DLIS use for education and library-related activities?

RQ5. What are the characteristics (ease and usefulness of use) of the apps used by students at SVU's DLIS?

RQ6. Which tasks do students at SVU's DLIS perform with smartphone apps?

RQ7. What are the positive and negative aspects of apps use by students at SVU's DLIS?

RQ8. What are the most significant barriers that affect the use and non-use of apps by students at SVU's DLIS?

Research methodology

This study was designed to describe the use patterns and ownership of smartphone apps among students at SVU's DLIS, Egypt. The descriptive research involves collecting data to answer questions or to test hypotheses concerning the current status of the subject of the study. It can provide valuable data (Gay, 1992). The descriptive method is useful for investigating a variety of educational problems. Typical descriptive studies are concerned with the assessment of attitudes, opinions, demographic information, conditions and procedures. Descriptive data are usually collected through a questionnaire survey, interviews or observation. This study used quantitative research methodology in the form of a survey, which was undertaken from February to March 2015. According to Kerlinger (1986), survey research is a useful tool for educational fact-finding and a means by which a great deal of information can be obtained from the population of the study. The survey instrument in this study was a self-administrated questionnaire, which was designed to collect data from participants. The survey form was thoroughly reviewed and approved by a panel of experts consisting of one professor and two associate professors who are interested in MITs, social media and teaching courses in the field of library and information sciences. The validity and reliability of the survey were checked through a pilot test implemented in the same department (SVU's DLIS) before the actual distribution. The questionnaire consisted of 25 questions, which were divided into nine sections. All but the last of the questions were closed-ended questions. The researcher opted to rely largely on closed-ended questions because they were more suited to the nature of the study's population who are not familiar with surveys and thus might be less willing to state their feelings or opinions through handwritten open-ended questions. The first section consisted of three questions concerning basic demographic characteristics (gender, age and class standing). The second section (two questions) was about the students' use/non-use of smartphones, as well as barriers to not using such kinds of mobile technologies. The third section (one question) asked whether the respondent used smartphone apps. The fourth section (ten questions) explored the characteristic use of smartphone apps, such as the frequency of the use, use level, time spent, knowledge about apps, number of smartphone devices owned and number and type of apps accessed. The fifth section (one question) was about the use of smartphone apps for education and library-related activities. The sixth section (one question) was about tasks performed with apps. The seventh section (five questions) concerned the perceptions of students regarding the use of apps, such as how easy they are to use, usefulness, trustfulness and their negative and positive aspects. The eighth section (one question) was concerned with problems encountered by students during their use of these apps. The ninth and final section contained one an open-ended question allowing students to add any comments, thoughts and suggestions that they would like to mention in their questionnaire, as well as opportunities to discuss issues that did not appear on the questionnaire. The questionnaire was completely anonymous with no identifying information. To introduce and explain it, a cover letter accompanied the questionnaire. According to Linsky (1975) and Borg et al. (1993), including a cover letter with the questionnaire may help motivate respondents to reply to the questionnaire. All returned valid questionnaires were coded by using a SPSS (version 17.0) spreadsheet.

Results and analysis

Study population

The population of this study is undergraduate students enrolled in the year 2014/
2015 at SVU's DLIS. In total, DLIS has 600 undergraduate students, of whom 523 are
females and 77 are males (Table I). DLIS' faculty members consist of one associate
professor, three assistant professors, three teaching assistants and seven tutors.
Questionnaires were distributed to almost all students. Of the total number (600),
536 were returned, but three were invalid because they were not complete. These
three questionnaires were eliminated from the analysis. Therefore, the resulting
sample was 533 students representing 89.3 per cent of the total number of students
of whom 463 were females, representing 88.5 per cent of the total female students at
DLIS, and 70 were males, representing 90.9 per cent of the total male students at
DLIS.

Findings and analyses of the study

The findings of this study are presented in the order asked in the questionnaire. They
are also handled in terms of the answer of the eight research questions of the study. As
appropriate, some items are cross-tabulated with others. The study sample consisted of
valid responses from 533 students representing the undergraduate students at the DLIS
of the SVU. Of these 533 students, 441 students were using smartphones, representing
82.7 per cent of the total sample, with 92 students (17.3 per cent) not using them. Table II
presents basic demographics:

RQ1. What are the demographic characteristics of smartphone users and non-users
at SVU's DLIS?

Of the 533 sampled students, there were 389 (73.0 per cent of the sample) female students
using smartphone apps which represents 74.4 per cent of the female representation at
DLIS. There were also 52 (9.8 per cent) male students who were using smartphone apps,
representing 67.5 per cent of the male representation at DLIS (mean = 1.88 and SD =
0.323). On the other hand, of the 533 surveyed students, 92 students were found to be
smartphone non-users. Of these 92 students, 18 were males, representing 19.6 per cent of
the sampled smartphone non-users, and 74 females, representing 80.4 per cent of the

| | Smartphone users | | Smartphone non-users | |
| | Males | Females | Males | Females |
Class standing	N*	N	N	N
Freshman	17/22	68/117	5/22	13/117
Sophomore	16/20	115/163	9/20	38/163
Junior	12/25	140/153	4/25	16/153
Senior	7/10	66/90	0/10	7/90
Total	52/77 (67.5%)	389/523 (74.4%)	18/77 (23.4%)	74/523 (14.1%)
	441/533 = 82.7%**		92/533 = 17.3%***	

Table I.
Use and class
standing cross-
tabulated with
gender

Notes: *The selected sample/the total number of students at DLIS; **The total number of
smartphone users (males and females)/the selected sample; ***The total number of smartphone
non-users (males and females)/the selected sample

The respondents' demography	Smartphone app users		Smartphone app non-users	
	Frequency	Percent of sample	Frequency	Percent of sample
Gender				
Male	52	9.8	18	3.4
Female	389	73.0	74	13.9
Age				
18	20	4.5	12	13.0
19-20	66	15.0	51	55.4
21-22	272	61.7	53	25.0
23-24	83	18.8	6	6.5
Class standing				
Freshman	84	19.0	18	19.6
Sophomore	131	29.7	47	51.1
Junior	153	34.7	20	21.7
Senior	73	16.6	7	7.6

Table II.
Demographic data of
smartphone users
and non-users

total sampled smartphone non-users (mean = 1.80 and SD = 0.399). Table III shows the
mean and standard deviation of both smartphone users and non-users.

When students were asked to indicate their class standing (freshman, sophomore,
junior and senior), 102 (19.1 per cent) indicated that they were freshman or first-year
students, 178 (33.4 per cent) were sophomore or second year students, 173 (32.5 per cent)
were junior or third-year students and 80 (15 per cent) were senior or fourth-year
students. The study showed that 84 (82.6 per cent) of freshman students, 131 (73.6 per
cent) of sophomore students, 153 (88.4 per cent) of junior students and 73 (91.3 per cent)
of senior students were found to be users of smartphone apps (mean = 2.48 and SD =
0.984).

The study also showed that the age of the surveyed students ranged from under 18 to
24. Students who are aged less than 18 years were 32 (6 per cent) students, students
between 19 and 20 years were 117 (21.6 per cent), students aged between 21 and 22 years
were 325 (60.8 per cent) and students aged between 23 and 24 years were 89 (16.7 per
cent). Smartphone users were 20 (62.5 per cent) students aged under 18 years old, 66 (56.4
per cent) students aged 19-20, 272 (83.7 per cent) students aged 21-22 and 83 (93.3 per
cent) students aged 23-24 (mean = 2.95 and SD = 0.720).

Students who were described to be smartphone app non-users were asked to
indicate reasons why they do not use cell phone apps and the significance of the
reasons, among four scales given to them and reasons why they are not using
smartphone apps. Students gave varied answers ranging from "not significant" to

The respondents' demography	N		Mean		SD	
	Smartphone users	Smartphone non-user	Smartphone users	Smartphone non-user	Smartphone users	Smartphone non-user
Gender	441	92	1.88	1.80	0.323	0.399
Class standing	441	92	2.48	2.17	0.984	0.833
Age	441	92	2.95	2.25	0.720	0.765

Table III.
Demographic data of
smartphone users
and non-users

"very significant". As shown in Table IV, findings revealed that 93.5 per cent of students indicated that time to access apps was at least "significant" to them, followed by adequate funds (81.5 per cent), connection to the internet (77.2 per cent), training about using apps (64.1 per cent), language and technical skills (60.8 per cent), knowledge about apps (58.7 per cent), awareness about apps (53.3 per cent) and appropriate apps (29.3 per cent).

Profile of smartphone users at SVU's DLIS

  RQ2. What are the features of the use of smartphones by students at SVU's DLIS (period of use, experience, first hearing about apps, location, the number of smartphones owned, smartphone brand and the number of apps accessed)?

As shown in Table V, findings showed that the highest percentage of smartphone users (46 per cent) indicated that they had been using these devices for four to five years, followed by 24.9 per cent using for more than six years, 21.8 per cent using for two to three years and just 7.3 per cent using for less than one year.

Barriers to not using smartphone apps	Very significant (%)	Significant (%)	Somewhat significant (%)	Not significant (%)
Lack of adequate funds needed to get business apps	34.8	46.7	18.5	0
Lack of time needed to access apps	23.9	69.6	6.5	0
Lack of training to use different apps	22.8	41.3	35.9	0
Lack of connection to the Internet needed to access apps	17.4	59.8	22.8	0
Lack of language and technical skills needed for some apps	12	48.9	39.1	0
Lack of the awareness of smartphone apps	5.4	47.8	46.7	0
Lack of the knowledge about smartphone apps	4.3	54.3	41.3	0
Lack of appropriate smartphone apps	4.3	25	67.4	3.3

Table IV.
Barriers to not using smartphone apps

Length of time using smart phone apps	N	(%)	Mean 2.89	Standard error of mean 0.041	SD 0.864
Less than one year	32	7.3			
2-3 years	96	21.8			
4-5 years	203	46			
More than 6 years	110	24.9			
Total	441	100			

Table V.
Length of time using smartphone apps

Findings showed that the largest number of smartphone users surveyed in this study (68 per cent) was advanced users, followed by expert users (16.1 per cent), intermediate users (13.6 per cent) and novice users (2.3 per cent) (Table VI).

As shown in Table VII, this study found that the largest number of smartphone users (57.1 per cent) first heard about the devices through friends, followed by the Web (19.7 per cent), TV/radio (10.2 per cent), magazines and newspapers (4.8 per cent), professional journals (3.9 per cent), books (3.2 per cent) and in class (1.1 per cent).

Students were asked to provide where they accessed smartphone apps. As Table VIII shows, the most frequent location of student use of apps was from their home and on the university campus. In detail, 100 per cent of smartphone users indicated that their access and use of these apps through their home/dormitory was most frequent, followed by the university campus (92.7 per cent), the university library (73.2 per cent), community centres (club, cyber and similar) (53.3 per cent), in class (51.7 per cent), the public library (42.8 per cent) and at work (19.9 per cent).

Expertise level of using smartphone apps	N	(%)	Mean 2.98	Standard error of mean 0.030	SD 0.623
A novice user	10	2.3			
An intermediate user	60	13.6			
An advanced user	300	68			
An expert user	71	16.1			
Total	441	100			

Table VI.
Expertise level of using smartphone apps

First hearing about smartphone apps	N	(%)	Mean 5.54	Standard error of mean 0.088	SD 1.842
Friends	252	57.1			
Web	87	19.7			
TV/radio	45	10.2			
Magazines and newspapers	21	4.8			
Professional journals	17	3.9			
Books	14	3.2			
In class	5	1.1			
Total	441	100			

Table VII.
Source of first hearing about smartphone apps

Location for accessing smartphone apps	Very high (%)	High (%)	Moderate (%)	Low (%)	Very low (%)
Home/dormitory	95.9	4.1	0	0	0
University campus	81	11.8	5.7	1.6	0
University library	37.4	35.8	30.6	5.7	0.5
Community centre (club, cyber, etc.)	27	26.3	34.2	12.5	0
Class	23.1	28.6	39.2	40	0
Public library	19.7	32.2	34.5	13.6	0
Work	7.3	12.7	30.8	34.5	14.7

Table VIII.
Location for accessing smartphone apps

Through one-way ANOVA testing, the study revealed that there is not a statistically significant difference at the $p > 0.05$ level between the demographic characteristics (age, gender and class standing) of smartphone users and their location when using apps (Table IX).

As shown in Table X, this study showed that a large number (82.1 per cent) of the students had just one device, followed by two (16.8 per cent) and three and more (1.1 per cent).

This study also showed that the predominant brand smartphone users own is Android (72.3 per cent, Samsung and Nokia), followed by Blackberry (12.9 per cent), iPhone (9.8 per cent) and Windows (5 per cent) (Table XI).

As shown in Table XII, findings indicate that the highest percentage of smartphone users (40.6 per cent) stated that they have from 21 to 25 apps, followed by 28.6 per cent having 11 to 20 apps, 20.9 per cent having from 26 to 30 apps, 8.2 per cent having from 6 to 10 apps, 2 per cent having more than 31 apps and just 1.6 per cent having from 1 to 5 apps:

| | | Statistics | | | Level of significance | | |
| | | | Standard | | | | Class |
Accessing smartphone apps	N	Mean	error	SD	Age	Gender	standing
Home/dormitory	441	4.96	0.009	0.198	0.492	0.403	0.524
University campus	441	4.72	0.031	0.641	0.365	0.909	0.391
University library	441	4.04	0.044	0.921	0.108	0.888	0.124
Community centre (club, cyber, etc.)	441	3.68	0.048	1.005	0.777	0.359	0.880
Class	441	3.66	0.044	0.933	0.542	0.899	0.662
Public library	441	3.58	0.045	0.955	0.234	0.293	0.876
Work	441	2.63	0.053	1.104	0.922	0.496	0.591

Table IX.
ANOVA (shortened) by the location of accessing apps

The number of smartphone devices owned by students	N	(%)	Mean 1.19	Standard error of mean 0.020	SD 0.421
One	362	82.1			
Two	74	16.8			
Three and more	5	1.1			
Total	441	100			

Table X.
Number of smartphone devices owned by smartphone app users

Smartphone brand owned by users	N	(%)	Mean 2.13	Standard error of mean 0.030	SD 0.640
Android (Samsung and Nokia)	319	72.3			
Blackberry	57	12.9			
iPhone	43	9.8			
Windows	22	5			
Total	441	100			

Table XI.
Smartphone brand owned by smartphone users

RQ3. Which types of apps do students at SVU's DLIS use most?

Among the six scales given to them, smartphone users were asked to report the types of apps they are using. Findings revealed that most students, as Table XIII shows, used communication and messaging/texting/SMS apps. In detail, 100 per cent of students indicated that "communication apps" and "messaging/texting/SMS" are used most frequently, followed by "social networking sites apps" (87 per cent), "entertainment apps" (80.3 per cent), "news apps" (62 per cent), "games apps" (32.4 per cent), "multimedia apps" (25.2 per cent), "education apps" (23 per cent), "health apps" (8.8 per cent) and "business apps" (6.6 per cent).

Using an one-way ANOVA, the study revealed that there is a statistically significant difference at the $p > 0.05$ level between the age of students and their use of types of apps, such as social networking sites apps ($p = 0.002$), entertainment apps ($p = 0.029$), multimedia apps ($p = 0.000$), education apps ($p = 0.000$), game apps ($p = 0.000$), health apps ($p = 0.030$) and business apps ($p = 0.029$). The study also revealed that there is a statistically significant difference between the gender of the students and their use of different types of apps, such as multimedia apps ($p = 0.049$) and education apps ($p = 0.005$), as well as their class standing and the types of apps used, such as communication apps ($p = 0.005$), social networking sites ($p = 0.000$), news apps ($p = 0.007$ per cent), multimedia apps ($p = 0.000$), education apps ($p = 0.000$), game apps ($p = 0.000$) and business apps ($p = 0.000$) (Table XIV).

The number of smartphones apps accessed by users	N	(%)	Mean 4.80	Standard error of mean 0.098	SD 2.051
21-25 apps	170	40.6			
11-20 apps	126	28.6			
26-30 apps	92	20.9			
6-10 apps	36	8.2			
More than 31 apps	10	2.0			
1-5 apps	7	1.6			
Total	441	100			

Table XII.
Number of apps accessed by smartphone users

Types of smartphone apps	Completely use (%)	Mostly use (%)	Slightly use (%)	Slightly not use (%)	Mostly not use (%)	Completely not use (%)
Communication apps	96.4	3.4	0.0	0.0	0.0	0.0
Messaging/texting/SMS apps	88.2	11.8	0.0	0.0	0.0	0.0
Social networking sites apps	48.8	38.3	10.0	2.9	0.0	0.0
Entertainment apps	27.0	53.3	19.0	0.7	0.0	0.0
News apps	11.1	51.2	31.3	6.3	0.0	0.0
Game apps	5.9	26.5	32.4	24.9	8.8	1.4
Education apps	3.4	20.0	48.8	21.1	6.6	0.2
Health apps	2.5	6.3	37.6	41.0	10.9	1.6
Multimedia apps	1.8	23.4	46.5	22.9	5.4	0.0
Business apps	0.5	13.4	46.9	32.7	6.1	0.5

Table XIII.
Types of smartphone apps used

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Table XIV.
Types of smartphone
apps used by
students and their
demographics

		Statistics			Level of significance		
Types of smartphone apps mostly used	N	Mean	Standard error	SD	Age	Gender	Class standing
Communication apps	441	5.97	0.009	0.181	0.184	0.851	0.005
Messaging/texting/SMS apps	441	5.88	0.015	0.323	0.956	0.393	0.471
Social networking sites apps	441	5.33	0.037	0.774	0.002	0.985	0.000
Entertainment apps	441	5.07	0.033	0.696	0.029	0.069	0.050
News apps	441	4.67	0.036	0.756	0.505	0.053	0.007
Multimedia apps	441	3.93	0.041	0.866	0.000	0.049	0.000
Education apps	441	3.92	0.043	0.908	0.000	0.005	0.000
Games apps	441	3.92	0.053	1.106	0.000	0.932	0.000
Health apps	441	3.44	0.044	0.915	0.030	0.158	0.183
Business apps	441	3.32	0.039	0.815	0.029	0.230	0.000

Students using smartphones were asked how many hours a day they spent using apps. They were given four options: 1 = one hour or less, 2 = 2-3 hours, 3 = 4-5 hours and 4 = 6 hours or more from which to choose only one. Findings showed that a large number of the students (85 per cent) spent six hours or more on using these apps, followed by 13.4 per cent spending between 4 to 5 hours a day and just 1.6 per cent who spent between 2 to 3 hours a day.

Among the six scales given to them, smartphone users were also asked to select the apps they were using. Findings revealed that the apps primarily used by students, as Table XV shows, were Facebook, e-mail, Twitter, WhatsApp and YouTube. In detail, 100 per cent of students indicated that Facebook, followed by e-mail (98.6 per cent), Twitter (96.1 per cent), WhatsApp (94.6 per cent), YouTube (93.7 per cent), Viber (67.4 per cent), Kik (66.9 per cent), Line (61.5 per cent), Skype (61.4 per cent), Tango (60.3 per cent), Google Mobile (44.7 per cent), Wikipedia Mobile (21.3 per cent), Instagram (11.5 per cent), Google Maps (11.1 per cent) and Flickr (9.5 per cent) were the popular apps.

Table XV.
Smartphone apps
accessed by students

Smartphone apps mostly accessed by students	Regularly used (%)	Frequently used (%)	Slightly used (%)	Slightly not used (%)	Infrequently used (%)	Not used (%)
E-mail app	84.1	14.5	1.4	0.0	0.0	0.0
Facebook	79.1	20.9	0.0	0.0	0.0	0.0
Twitter	69.6	26.5	2.7	0.9	0.2	0.0
YouTube	67.6	26.1	4.5	1.6	0.2	0.0
WhatsApp	65.8	28.8	4.3	0.9	0.2	0.0
Kik	22.7	44.2	28.6	4.5	0.0	0.0
Viber	22.0	45.4	30.4	2.3	0.0	0.0
Line	16.8	44.7	33.3	5.2	0.0	0.0
Skype	16.3	45.1	34.0	4.5	0.0	0.0
Tango	16.1	44.2	34.7	5.0	0.0	0.0
Google Mobile	7.9	36.8	21.4	22.8	9.5	1.1
Wikipedia Mobile	2.0	19.3	62.4	15.2	0.7	0.5
Instagram	2.0	9.5	24.5	37.6	20.2	6.1
Google Maps	2.0	9.1	24.3	38.1	20.4	6.1
Flickr	1.8	7.7	25.2	38.5	20.6	6.1

Through the one-way ANOVA test, the results show that there is a statistically significant difference at the $p > 0.05$ level between the age of students and apps that are accessed, such as Facebook ($p = 0.044$), Viber ($p = 0.000$), Kik ($p = 0.000$), Instagram ($p = 0.002$), Google Maps ($p = 0.005$) and Flickr ($p = 0.002$). The study also revealed that there is a statistically significant difference between the students' gender and apps that are accessed by them, such as Viber ($p = 0.011$) and Kik ($p = 0.006$), as well as their class standing and apps that are primarily accessed by them, such as e-mail ($p = 0.000$), Facebook ($p = 0.001$), Viber ($p = 0.000$), Kik ($p = 0.000$), Instagram ($p = 0.000$), Google Maps ($p = 0.000$) and Flickr ($p = 0.000$) (Table XVI):

RQ4. Which apps do students at SVU's DLIS use for education and library-related activities?

Findings revealed that some smartphone users were using apps for professional purposes, such as Google Mobile, Facebook, e-mail, Twitter, YouTube, WhatsApp, Wikipedia Mobile and Instagram. In detail, when all smartphone users in this study were asked to indicate if they use apps for education and library-related activities or not, they reported that they were using some apps, such as Google Mobile (81.4 per cent), Facebook (78.9 per cent), e-mail (71 per cent), Twitter (67 per cent), YouTube (61 per cent), Wikipedia Mobile (49.2 per cent) and Instagram (34 per cent):

RQ5. What are the characteristics (ease and usefulness of use) of the apps' use by students at SVU's DLIS?

Students were asked to indicate the ease of use of smartphone apps. As shown in Table XVII, findings reveal that e-mail, Google Mobile, Facebook, WhatsApp, Kik, Twitter and YouTube are the easiest-to-use apps as indicated by students. In detail, 100 per cent of students indicated that the use of an e-mail app was at least fairly easy to them, followed by Google Mobile (95.9 per cent), Facebook (95.7 per cent), WhatsApp (93.9 per cent), Kik (93.7 per cent), Twitter (93.2 per cent), YouTube (93.2 per cent), Google Maps (92.8 per cent), Viber (92.5 per cent), Line (92.3 per cent), Skype (92.3 per

Smartphone apps mostly accessed by students		Statistics			Level of significance	
	Mean	Standard error	SD	Age	Gender	Class standing
E-mail app	5.83	0.020	0.413	0.095	0.277	0.000
Facebook	5.79	0.019	0.407	0.044	0.132	0.001
Twitter	5.64	0.029	0.605	0.318	0.901	0.742
YouTube	5.59	0.032	0.675	0.417	0.698	0.540
WhatsApp	5.59	0.031	0.641	0.486	0.703	0.917
Viber	4.87	0.037	0.774	0.000	0.011	0.000
Kik	4.85	0.039	0.820	0.000	0.006	0.000
Line	4.73	0.038	0.799	0.515	0.141	0.857
Skype	4.73	0.037	0.784	0.386	0.442	0.158
Tango	4.71	0.038	0.792	0.501	0.275	0.259
Google Mobile	4.07	0.056	1.182	0.648	0.102	0.092
Wikipedia Mobile	4.05	0.033	0.702	0.794	0.086	0.079
Instagram	3.17	0.053	1.109	0.002	0.185	0.000
Google Maps	3.16	0.053	1.103	0.005	0.332	0.000
Flickr	3.13	0.051	1.077	0.002	0.349	0.000

Table XVI.
Smartphone apps accessed by students and their demography

Ease of use of smartphone apps	Extremely easy (%)	Fairly easy (%)	No strong opinion (%)	Not at all easy (%)	Have never used (%)
E-mail app	80.5	19.5	0.0	0.0	0.0
Facebook	65.3	30.2	4.5	0.0	0.0
Twitter	63.5	30.2	4.8	0.7	0.9
Skype	44.0	48.3	7.7	0.0	0.0
Line	43.8	48.5	7.7	0.0	0.0
WhatsApp	42.2	51.7	6.1	0.0	0.0
Tango	42.2	49.9	7.9	0.0	0.0
YouTube	40.1	53.1	6.8	0.0	0.0
Viber	39.9	52.6	7.0	0.0	0.5
Flickr	34.0	56.7	7.9	0.9	0.5
Google Maps	28.8	64.2	6.1	0.2	0.5
Google Mobile	21.1	75.1	3.9	0.0	0.0
Wikipedia Mobile	19.5	70.5	8.8	0.7	0.5
Instagram	17.0	74.6	2.5	2.0	3.9
Kik	15.6	42.0	27.7	10.2	4.5

Table XVII.
Ease of the use of smartphone apps by students at SVU's DLIS

cent), Tango (92.1 per cent), Instagram (91.4 per cent), Flickr (90.7 per cent) and Wikipedia Mobile (90.1 per cent).

Smartphone app users were also asked to indicate the usefulness of the apps they are using. Findings, as Table XVIII shows, reveal that e-mail, Google Mobile, WhatsApp, Facebook, YouTube, Twitter and Viber are the most useful apps. In all, 100 per cent of students indicated that the use of the e-mail app was at least fairly useful to them, followed by Google Mobile (99.3 per cent), WhatsApp (99.1 per cent), Facebook (98.9 per cent), YouTube (98.9 per cent), Twitter (98.7 per cent), Viber (97.1 per cent), Instagram

Usefulness of smartphone apps	Extremely useful (%)	Fairly useful (%)	No strong opinion (%)	Not at all useful (%)	Have never used (%)
YouTube	81.2	17.7	1.1	0.0	0.0
Twitter	78.2	20.6	1.1	0.0	0.0
WhatsApp	77.1	21.8	1.1	0.0	0.0
Facebook	68.9	29.9	1.1	0.0	0.0
Google Mobile	68.5	30.8	0.7	0.0	0.0
Viber	67.3	29.9	2.7	0.0	0.0
E-mail	66.0	34.0	0.0	0.0	0.0
Instagram	63.3	31.7	3.9	0.2	0.9
Kik	63.0	30.4	5.4	0.2	0.9
Google Maps	62.6	31.5	5.7	0.2	0.0
Skype	43.3	49.9	6.8	0.0	0.0
Line	42.6	49.4	7.9	0.0	0.0
Tango	42.2	47.6	10.2	0.0	0.0
Wikipedia Mobile	28.1	66.4	5.4	0.0	0.0
Flickr	21.8	64.2	12.0	2.0	0.0

Table XVIII.
Usefulness of smartphone apps

(95.1 per cent), Wikipedia Mobile (94.3 per cent), Google Maps (94.1 per cent), Kik (93.4 per cent), Skype (93.2 per cent), Line (91.9 per cent), Tango (89.8 per cent) and Flickr (85.9 per cent).

Through the one-way ANOVA test, findings reveal that there is a statistically significant difference at the $p > 0.05$ level between the age of students and the ease of apps' use, such as YouTube ($p = 0.008$), Flickr ($p = 0.000$), Google Mobile ($p = 0.009$), Google Maps ($p = 0.000$), Instagram ($p = 0.030$) and Kik ($p = 0.012$). There is also a statistically significant difference between the students' gender and the ease of their use of apps, such as Facebook ($p = 0.031$), as well as their class standing and Facebook ($p = 0.015$), WhatsApp ($p = 0.000$), YouTube ($p = 0.000$), Viber ($p = 0.000$), Flickr ($p = 0.000$), Google Mobile ($p = 0.000$), Google Maps ($p = 0.000$), Instagram ($p = 0.001$) and Kik ($p = 0.000$). The study also revealed that there is a statistically significant difference at the $p > 0.05$ level between gender and the usefulness of the app, such as Facebook ($p = 0.043$) and Viber ($p = 0.040$), as well as their class standing and e-mail ($p = 0.008$), Facebook ($p = 0.024$), Twitter ($p = 0.005$), WhatsApp ($p = 0.007$), Viber ($p = 0.004$) and Google Mobile ($p = 0.042$) (Table XIX):

RQ6. Which tasks do students perform with smartphone apps?

Students were asked to report their level of the importance of the tasks done using apps. As shown in Table XX, findings revealed that the highest level of importance was "sending and receiving messages" and "following the news". In detail, 100 per cent of students indicate that "sending and receiving messages" and "following the news" are at least important to them, followed by "making communications" (99.5 per cent), "making chat" (99.4 per cent), "making friends" (99.3 per cent), "finding specific information" (97.7 per cent), "finding general information" (97.7 per cent), "making discussion groups" (97.5 per cent), "wasting time" (78.4 per cent), "playing games" (73.4 per cent), "completing class assignments" (62.3 per cent), "checking materials related to courses" (58.7 per cent), "doing business" (56 per cent), "seeking jobs" (54.4 per cent), "watching movies" (39.2 per cent), "listening to music" (15.9 per cent), "accessing library services" (6.6 per cent) and "dating someone" (1.6 per cent).

Through the one-way ANOVA test, findings indicated that there is a statistically significant difference at the $p > 0.05$ level between the age of students and tasks performed on apps, such as finding general information ($p = 0.005$), finding specific information ($p = 0.011$), watching movies ($p = 0.004$), listening to music ($p = 0.039$) and accessing library services ($p = 0.006$). There is also a statistically significant difference between gender and tasks done on apps, such as completing class assignments ($p = 0.019$), checking materials related to courses ($p = 0.045$), seeking jobs ($p = 0.020$) and dating someone ($p = 0.001$). The study also found that there is a statistically significant difference between class standing and tasks completed done on apps, such as finding general information ($p = 0.000$), finding specific information ($p = 0.000$), making discussion groups ($p = 0.035$), wasting time ($p = 0.000$) and playing games ($p = 0.000$), seeking jobs ($p = 0.021$), dating someone ($p = 0.008$), wasting time ($p = 0.000$), playing games ($p = 0.000$), watching movies ($p = 0.000$), listening to music ($p = 0.000$) and accessing library services ($p = 0.001$) (Table XXI):

RQ7. What are the positive and negative aspects of the use of app by students at SVU's DLIS?

| Ease and usefulness of using apps | Ease of using apps | | | | | | The usefulness of using apps | | | | | |
| | Statistics | | | Level of significance | | | Statistics | | | Level of significance | | |
	Mean	Standard error	SD	Age	Gender	Class standing	Mean	Standard error	SD	Age	Gender	Class standing
E-mail app	4.80	0.019	0.397	0.834	0.672	0.101	4.66	0.023	0.474	0.109	0.077	0.008
Facebook	4.61	0.027	0.574	0.182	0.031	0.015	4.68	0.023	0.491	0.415	0.043	0.024
Twitter	4.55	0.033	0.703	0.329	0.452	0.460	4.77	0.021	0.477	0.911	0.105	0.005
WhatsApp	4.36	0.028	0.595	0.065	0.496	0.000	4.76	0.022	0.454	0.755	0.143	0.007
Line	4.36	0.030	0.621	0.943	0.514	0.797	4.35	0.030	0.621	0.841	0.059	0.250
Skype	4.36	0.030	0.621	0.167	0.788	0.125	4.37	0.029	0.607	0.453	0.329	0.886
Tango	4.34	0.030	0.620	0.107	0.366	0.095	4.32	0.031	0.650	0.516	0.712	0.906
YouTube	4.33	0.029	0.599	0.008	0.412	0.000	0.480	0.020	0.428	0.911	0.131	0.828
Viber	4.32	0.031	0.642	0.290	0.436	0.000	4.65	0.025	0.533	0.173	0.040	0.004
Flickr	4.23	0.032	0.667	0.000	0.495	0.000	4.06	0.031	0.646	0.860	0.249	0.999
Google Maps	4.21	0.028	0.598	0.000	0.830	0.000	4.56	0.029	0.611	0.365	0.263	0.408
Google Mobile	4.17	0.022	0.469	0.009	0.763	0.000	4.068	0.023	0.482	0.524	0.252	0.042
Wikipedia Mobile	4.08	0.028	0.588	0.637	0.331	0.101	4.23	0.025	0.534	0.501	0.954	0.530
Instagram	3.99	0.038	0.790	0.030	0.939	0.001	4.56	0.032	0.668	0.365	0.543	0.525
Kik	3.54	0.049	1.020	0.012	0.081	0.000	4.54	0.033	0.693	0.388	0.431	0.670

Table XIX.
Ease and usefulness
of apps

Tasks done on smartphone apps	Very important (%)	Important (%)	Somewhat important (%)	Not important (%)
Sending and receiving messages	94.6	5.4	0.0	0.0
Following the news	82.3	17.7	0.0	0.0
Finding general information	74.1	23.6	2.3	0.0
Finding specific information related to courses	70.7	27.0	2.3	0.0
Making friends	63.0	36.3	0.7	0.0
Making a chat	63.0	36.3	0.7	0.0
Making communications	61.9	37.6	0.5	0.0
Making discussion groups	58.5	39.0	2.5	0.0
Wasting time	44.7	33.6	15.6	5.9
Playing games	34.7	38.5	21.1	5.4
Watching movies/videos	16.3	22.9	36.3	24.5
Checking materials related to courses, grades, etc.	5.4	53.3	40.1	1.1
Listening to music	5.2	10.7	48.3	35.8
Completing class assignments	5.0	57.4	37.6	0.0
Doing business	5.0	51.0	43.1	0.9
Seeking jobs	4.1	50.3	44.0	1.6
Accessing library services	0.9	5.7	46.3	47.2
Dating someone	0.2	1.4	32.2	66.2

Table XX.
Purpose of apps and
importance

Tasks done on smartphone apps	N	Statistics			Level of significance		
		Mean	Standard error	SD	Age	Gender	Class standing
Sending and receiving messages	441	3.95	0.011	0.227	0.741	0.159	0.714
Following the news	441	3.82	0.018	0.382	0.702	0.279	0.124
Finding general information	441	3.72	0.024	0.498	0.005	0.631	0.000
Finding specific information related to courses	441	3.68	0.024	0.512	0.011	0.911	0.000
Making friends	441	3.62	0.024	0.499	0.745	0.473	0.220
Making a chat	441	3.62	0.24	0.499	0.745	0.473	0.220
Making communications	441	3.61	0.024	0.497	0.477	0.777	0.146
Making discussion groups	441	3.56	0.026	0.545	0.619	0.565	0.035
Wasting time	441	3.17	0.043	0.902	0.089	0.253	0.000
Playing games	441	3.03	0.042	0.882	0.477	0.568	0.000
Completing class assignments	441	2.67	0.027	0.566	0.828	0.019	0.509
Checking materials related to courses, grades, etc.	441	2.63	0.029	0.604	0.603	0.045	0.603
Doing business	441	2.60	0.029	0.599	0.900	0.056	0.754
Seeking jobs	441	2.57	0.029	0.600	0.425	0.020	0.021
Watching movies/videos	441	2.31	0.048	1.016	0.004	0.255	0.000
Listening to music	441	1.85	0.038	0.808	0.039	0.670	0.000
Accessing library services	441	1.60	0.030	0.639	0.006	0.141	0.001
Dating someone	441	1.36	0.025	0.520	0.080	0.001	0.008

Table XXI.
Tasks performed on
apps and student
demographics

Smartphone users were asked to report their level of agreement or disagreement about some positive attitudes towards the use of apps. As shown in Table XXII, all students indicated very positive attitudes towards the use of apps as 100 per cent of them at least "agreed" with the statement that smartphone apps allow for easy dissemination of information, provide much information, increase the speed of finding information, help communication, are convenient, secure, build confidence and reduce paper use. Of the 441 students, 0.7 per cent said that they strongly agree that the apps are credible, followed by 38.3 per cent as agree, 28 per cent with no strong opinion, 21.1 per cent disagreed and 11.8 per cent who strongly disagreed with the statement.

Using the one-way ANOVA test, the study reveals that there is not a statistically significant difference at the $p > 0.05$ level between demographic characteristics of students (age, gender and class standing) and their positive attitudes towards the use of smartphone apps (Table XXIII).

Students were also asked to report their level of agreement or disagreement about some of the negative attitudes towards the use of smartphone apps. As shown in Table XXIV, 99.5 per cent of the students at least agree with the statement that apps "are

Positive statement about smartphone apps	Strongly agree (%)	Agree (%)	No strong opinion (%)	Disagree (%)	Strongly disagree (%)
Provide much information	45.4	54.6	0.0	0.0	0.0
Reduce paper use	44.7	55.3	0.0	0.0	0.0
Are secure	43.5	56.5	0.0	0.0	0.0
Allow for easy dissemination of information	42.6	57.4	0.0	0.0	0.0
Build confidence	41.7	58.3	0.0	0.0	0.0
Are convenient	41.5	58.5	0.0	0.0	0.0
Help communication	41.0	59.0	0.0	0.0	0.0
Increase the speed of finding information	39.5	60.5	0.0	0.0	0.0
Are credible	0.7	38.3	28.1	21.1	11.8

Table XXII.
Positive statements about the use of smartphone apps by students

Positive statements about the use of smartphone apps		Statistics			Level of significance		
	N	Mean	Standard error	SD	Age	Gender	Class standing
Provide much information	441	4.45	0.24	0.498	0.276	0.675	0.861
Reduce paper use	441	4.45	0.024	0.498	0.589	0.339	0.795
Are secure	441	4.44	0.024	4.96	0.439	0.915	0.944
Allow for easy dissemination of information	441	4.43	0.024	0.495	0.440	0.960	0.926
Build confidence	441	4.42	0.024	0.494	0.727	0.491	0.829
Help communication	441	4.41	0.023	0.492	0.275	0.620	0.325
Are convenient	441	4.41	0.023	0.493	0.316	0.863	0.841
Increase the speed of finding information	441	4.39	0.023	0.489	0.530	0.884	0.877
Are credible	441	2.95	0.050	1.04	0.239	0.446	0.722

Table XXIII.
Positive statements about value of apps and student demographics

time consuming", followed by 99.4 per cent who indicate that the apps "are intimidating", 99.3 per cent respondents at least agree that the apps are "addictive", 99.1 per cent at least agree that the apps "violate privacy", 99 per cent who at least agree that the apps "require high language and technical skills", 64.7 per cent who agree that the apps "are harmful", 20.6 per cent who agree that these apps "are frustrating" and 16.8 per cent who agree that these apps "are harmful".

With the use of the one-way ANOVA test, findings in this section reveal that there is not a statistically significant difference at the $p > 0.05$ level between student age and negative attitudes towards the use of apps. Findings also reveal that there is not a statistically significant difference between gender and class standing and almost all of the negative attitudes towards the use of apps. The study also revealed that there is a statistically significant difference between gender and some of the negative aspects of the use of apps, such as that these apps require high skill ($p = 0.006$) and are intimidating ($p = 0.041$), as well as students' class standing and the violation of privacy that these apps may cause ($p = 0.003$) (Table XXV).

This study revealed that the smartphone apps users trust in, as Table XXVI shows, are WhatsApp, e-mail, YouTube, Facebook, Flickr and Twitter. In detail, 99.5 per cent of users confirmed that they trust "What's App", followed by "e-mail" (98.4 per cent), "YouTube" (96.8 per cent), "Facebook" (95.2 per cent), "Flickr" (95.1 per cent), "Twitter" (94.8 per cent), "Viber" (94.6 per cent), "Kik" (93.9 per cent), "Google Mobile" (92.7 per cent), "Line" (91.2 per cent), "Google Maps" (90.5 per cent), "Instagram" (90.1 per cent), "Tango" (89.8 per cent), "Skype" (88 per cent) and "Wikipedia Mobile" (56 per cent).

Negative statements about smartphone apps	Strongly agree (%)	Agree (%)	No strong opinion (%)	Disagree (%)	Strongly disagree (%)
Are time consuming	78.2	21.3	0.5	0.0	0.0
Are addictive	73.2	26.1	0.7	0.0	0.0
Require high skills (language and technical skills)	72.6	26.5	0.9	0.0	0.0
Violate privacy	71.7	27.2	1.1	0.0	0.0
Are intimidating	66.4	33.1	0.5	0.0	0.0
Are harmful	0.0	16.8	48.1	34.0	1.1
Are frustrating	0.0	20.6	48.8	29.3	1.4

Table XXIV.
Negative statements about the use of smartphone apps

Negative statements about the use of smartphone apps	N	Statistics			Level of significance		
		Mean	Standard error	SD	Age	Gender	Class standing
Are time consuming	441	4.78	0.020	0.427	0.732	0.219	0.826
Are addictive	441	4.73	0.022	0.462	0.580	0.092	0.078
Require high skills (language and technical skills)	441	4.72	0.022	0.471	0.929	0.006	0.643
Violate privacy	441	4.71	0.023	0.481	0.527	0.052	0.003
Are intimidating	441	4.66	0.023	0.484	0.764	0.041	0.232
Are frustrating	441	2.89	0.035	0.736	0.295	0.534	0.598
Are harmful	441	2.80	0.034	0.719	0.235	0.703	0.952

Table XXV.
Negative statements about smartphone apps and student demographics

Apps	Strongly trustful (%)	Trustful (%)	Neutral (%)	Untrusted (%)	Strongly untrusted (%)
E-mail app	81.6	15.9	1.6	0.0	0.0
WhatsApp	66.4	33.1	0.5	0.0	0.0
YouTube	62.6	34.2	3.2	0.0	0.0
Twitter	60.5	34.2	3.9	1.4	0.0
Facebook	58.0	37.2	3.2	1.6	0.0
Flickr	58.0	37.0	3.2	1.8	0.0
Kik	56.9	37.0	5.2	0.9	0.0
Viber	56.7	36.1	3.4	1.8	0.0
Google Mobile	56.2	36.5	63	0.9	0.0
Google Maps	50.1	40.4	9.3	0.2	0.0
Instagram	49.9	41.0	7.7	1.4	0.0
Line	49.4	41.7	7.5	1.4	0.0
Tango	48.8	41.0	8.8	1.4	0.0
Skype	46.7	41.3	11.1	0.9	0.0
Wikipedia Mobile	6.6	49.2	38.8	5.2	0.2

Table XXVI.
Trust in smartphone apps by students at SVU's DLIS

The one-way ANOVA test revealed that there is not a statistically significant difference at the $p > 0.05$ level between the age of students and their trust in Facebook, Viber, Flickr, Google Maps, Instagram, YouTube, WhatsApp, Wikipedia Mobile, Line, Tango and Skype. The study also reveals that there is not a statistically significant difference between gender and trust in e-mail, Facebook, Viber, Flickr, Google Maps, Instagram, Twitter, YouTube, WhatsApp, Wikipedia Mobile, Line, Tango and Skype, as well as the students' class standing and their trust in e-mail, Facebook, Viber, Flickr, Google Maps, Instagram, YouTube, WhatsApp, Wikipedia Mobile, Line, Tango and Skype. On the other hand, the study reveals that there is a statistically significant difference at the $p > 0.05$ level between the students' age and their trust in Twitter ($p = 0.024$). There is also a statistically significant difference between the students' gender and their trust in WhatsApp ($p = 0.041$), as well as their class standing and trust in Twitter ($p = 0.002$) and Kik ($p = 013$) (Table XXVII):

RQ8. What are the most significant barriers that affect both use and non-use of apps by students at SVU's DLIS?

Students were asked to report the level, among four scales given to them, of barriers that may affect their use of apps. They gave variant answers ranging from "not significant" to "very significant". As shown in Table XXVIII, findings reveal that 51.9 per cent of smartphone app users indicate that the lack of "training to use different apps" and "appropriate smartphone apps" were not significant to them, followed by "lack of the awareness of smartphone apps" (50.3 per cent), "lack of time needed to access apps" (49.7 per cent), "lack of language and technical skills needed for some apps" (48.8 per cent), "lack of the connection to the Internet needed to access apps" (48.3 per cent,), "lack of knowledge about smartphone apps" (47.6 per cent) and "lack of adequate funds needed to get business apps" (46.9 per cent).

The one-way ANOVA test reveals that there is not a statistically significant difference at the $p > 0.05$ level between demographic characteristics (age and gender) of smartphone apps users and barriers to using apps. There is only a statistical relation

Apps	N	Mean	Statistics Standard error	SD	Age	Level of significance Gender	Class standing
E-mail app	441	5.26	0.228	4.783	0.891	0.400	0.292
WhatsApp	441	4.66	0.023	0.484	0.764	0.041	0.232
YouTube	441	4.59	0.029	0.553	0.162	0.440	0.344
Twitter	441	4.54	0.030	0.639	0.024	0.363	0.002
Facebook	441	4.52	0.030	0.640	0.407	0.979	0.554
Viber	441	4.52	0.031	0.654	0.781	0.842	0.465
Flickr	441	4.51	0.031	0.650	0.326	0.225	0.499
Kik	441	4.50	0.030	0.640	0.400	0.481	0.013
Google Mobile	441	4.48	0.031	0.657	0.066	1.000	0.114
Google Maps	441	4.40	0.032	0.664	0.303	0.507	0.846
Instagram	441	4.39	0.033	0.690	0.692	0.334	0.090
Line	441	4.39	0.033	0.686	0.406	0.764	0.686
Tango	441	4.39	0.033	0.702	0.679	262	0.074
Skype	441	4.34	0.034	0.708	0.329	0.246	0.255
Wikipedia Mobile	441	3.57	0.034	0.689	0.282	0.476	0.116

Table XXVII.
Trust in apps and
student
demographics

between their class standing and training for using the apps ($p = 0.007$). On the other
hand, there is a statistically significant difference at the $p > 0.05$ level between the age
of smartphone apps non-users and "adequate funds to get non-free apps" ($p = 0.003$),
"time to access apps" ($p = 0.016$), "training about using apps" ($p = 0.000$) and
"appropriate apps" ($p = 0.021$). There is a statistically significant difference at the $p >
0.05$ level between class standing of smartphone non-users and barriers to use apps,
such as "adequate funds" ($p = 0.007$), "knowledge about apps" ($p = 0.023$), "connection
to the Internet" ($p = 0.018$) and "training about using apps" ($p = 0.000$) (Table XXIX).

Barriers to use smartphone apps	Very significant (%)	Significant (%)	Somewhat significant (%)	Not significant (%)
Lack of training to use different apps	0.0	9.8	38.3	51.9
Lack of appropriate smartphone apps	0.0	9.3	38.8	51.9
Lack of the awareness of smartphone apps	0.0	10.9	38.8	50.3
Lack of time needed to access apps	0.0	11.1	39.2	49.7
Lack of language and technical skills needed for some apps	0.0	10.9	40.4	48.8
Lack of a connection to the Internet needed to access apps	0.0	11.0	40.6	48.3
Lack of knowledge about smartphone apps	0.0	11.3	41.0	47.6
Lack of adequate funds needed to get business apps	0.0	11.8	41.3	46.9

Table XXVIII.
Barriers to use
smartphone apps by
smartphone users at
SVU's DLIS

| Barriers are due to lack of | Smartphone apps users | | | | | | Smartphone apps non-users | | | | | |
| | Statistics | | | Significance | | | Statistics | | | Significance | | |
	N	Mean	SD	Age	Gender	Class standing	N	Mean	SD	Age	Gender	Class standing
Adequate funds to get non-free apps	441	1.65	0.682	0.580	0.952	0.840	92	3.17	0.735	0.003	0.981	0.007
Knowledge about apps	441	1.64	0.677	0.103	0.977	0.506	92	2.63	0.569	0.093	0.765	0.023
Internet connection	441	1.63	0.676	0.195	0.941	0.505	92	2.95	0.635	0.111	0.100	0.018
Language and technical skills	441	1.62	0.674	0.353	0.346	0.350	92	2.73	0.665	0.055	0.255	0.138
Awareness about apps	441	1.61	0.676	0.321	0.588	0.667	92	2.59	0.596	0.520	0.260	0.240
Time to access apps	441	1.61	0.678	0.613	0.820	0.960	92	2.17	0.526	0.016	0.667	0.292
Training about using apps	441	1.58	0.663	0.103	0.646	0.007	92	2.87	0.759	0.000	0.570	0.000
Appropriate apps	441	1.57	0.657	0.271	0.970	0.703	92	2.30	0.607	0.021	0.133	0.054

Table XXIX.
Barriers to using
apps and student
demographics

Discussions and conclusions
This study, which is the first of its kind about university students in Egypt, investigated the use patterns and ownership of smartphone apps among students at the DLIS at SVU. Based on the results of this study, smartphone users (82.7 per cent) at SVU's DLIS tend to be females aged between 21 and 22 years and are mostly junior students. On the other hand, smartphone non-users (17.3 per cent) tended to be also females aged between 9 and 20 years and are mostly sophomore students. These findings are highly consistent with other surveys, such as the Pearson Student Mobile Device Survey (2014), which showed that female students dominate smartphone use. Before moving to the profile of smartphone users, the researcher would like to draw attention to the reasons that led to the non-use of smartphone apps by some of the sampled students at SVU's DLIS. Time to access these apps, followed by inadequate funds needed to get business apps, connection to the internet, training about using apps, language and technical skills, knowledge and awareness about apps and availability of appropriate apps were at least significant to not using these apps among 92 (17.3 per cent) students of the total sample.

This study revealed a widespread use of smartphones by 441 (82.7 per cent) of the students who were found to be smartphone users. It is worth mentioning that Egypt is ranked 19th globally in terms of possession of individuals with mobile phones. According to the Ministry of Communications and Information Technology (2012), the number of mobile subscriptions in Egypt reached 92,640,000 mobile users as of July 2012. This means that the number of subscribers is greater than the number of people who live in Egypt (80,471,869). Smartphones make up 8.4 per cent of all mobile phone handsets in Egypt (Vallabhan, 2012). Such a high percentage in the use of smartphones among students at SVU's DLIS is very highly consistent with other relevant surveys, such as the UCAS Media survey, conducted in 2014, and the Pearson Student Mobile Device Survey, conducted by Harris Poll (2014), which revealed that 82 and 83 per cent, respectively, of college students own smartphones. The highest percentage of smartphone users indicated that they had been using smartphones for four to five years. This may indicate that they have caught up with the beginnings of these devices in Egypt, which is witnessing a big demand in the sale of these devices and regarded by some specialists as a promising market in this regard.

The largest number of students was described to be advanced users who first heard about mobile devices through friends and the Web being one of the most frequent ways to access MITs. Consistent with Mazloomy *et al.* (2009), the most frequent location of students' access to these apps was from home/dormitory and the university campus where information networks, particularly Wi-Fi networks, are available. Similar to Alfawareh and Jusoh (2014), Song and Lee (2012) and the Pearson Student Mobile Device Survey (2014), this study showed that a majority of smartphone users were using a single smartphone device and a few of them were just using two devices, and the most predominant and popular brand they own was Android, followed by iPhone, Blackberry and Windows. Although the price of these devices is relatively expensive in Egypt, they are available in abundance, particularly Android devices, such as Samsung. The highest percentage of smartphone users indicated that they have 21 to 25 apps followed by 11 to 20 apps and 26 to 30 apps. A few indicated that they have more than 31 apps. Such a number is highly consistent with the world's average number ($n = 26$) of downloaded apps by smartphone users (Michael, 2013).

Regarding the use patterns of smartphones among LIS students, the findings of this study are highly consistent with the findings of Adomi (2006) as the two studies revealed that a majority of the students were using apps mainly for making communication with their family and friends, as well as sending and receiving messages. A large number of smartphone users at SVU's DLIS have been described as making excessive use of social apps, such as communication apps, messaging/texting apps and social networking sites, which are at the forefront of use. Other apps, such as entertainment apps, news apps, game apps, multimedia apps, education apps, health apps and business apps were also found to be used by students. Chen and Denovelles (2013) revealed that most popular apps favoured by university students were social networking, music, games, navigation, entertainment, photography, news, university, books, reference and productivity:

> The popularity of mobile devices among students and the availability of touch screen devices make mobile devices an ideal avenue for delivering content that can be accessed anywhere and everywhere, on the go (Tsoi and Dekhane, 2011, p. 543).

For some students, smartphones have become a necessary and addictive tool. In this regard, Baghianimoghadam et al. (2013) showed that nearly a quarter of surveyed students had tried to decrease their use of these devices but were unsuccessful. Smartphone users in this study spend an average of five hours per day using these apps, especially social networking apps. Such use is close to the international trend, as some previous studies, such as Uys et al. (2012), showed that the average hours spent by students on their smartphones communicating and interacting with others was five hours per day.

A large number of smartphone users at SVU's DLIS widely adopted these devices, especially for communication purposes, as most of the apps were described to be communication apps. The most used apps were Facebook, e-mail, Twitter, WhatsApp, YouTube and Viber. Such use is moderate compared to other similar studies, such as the study of Dresselhaus and Shrode (2012), which helped to gain insight into where students stand regarding their use of mobile devices for academic activities in general and their desire for access to library resources and services in particular. However, such use is consistent with the UCAS (2014) Media survey, which indicated that nearly 60 per cent of university students use their smartphones more to access social media.

Smartphone users at SVU's DLIS used smartphones more for communication purposes than learning purposes. While these findings are not consistent with the study of Bomhold (2013), which indicated that students do use smartphone apps for more than communication and entertainment, where a significant number of them disclose using apps to find academic information on academic websites using related search engines, they are consistent with the findings of White and Mills (2012) whose results showed that students are increasingly adopting these mobile devices for personal use, but they are still reluctant to use them for educational purposes. This study revealed that some of SVU's DLIS students were using some of apps related to educational purposes, such as Google Mobile, Facebook, e-mail, Twitter, YouTube, Wikipedia Mobile and Instagram, but not on a regular basis.

Sometimes academic institutions and libraries, as the case of SVU's libraries, fail to meet the needs of their patrons regarding some specific information. Because of these failures and constraints, Anyanwu et al. (2012) showed that students using the libraries

were occasionally using their smartphones for research. Findings also reveal that students were pushed to use smartphone devices for some reasons, such as the lack of relevant information sources in libraries, saving time and the cost of travelling to other libraries for research, a low level of satisfaction derived from available resources and lack of internet facilities in libraries. While Abdul Karim *et al.* (2006) noted that students' perceptions on the application of wireless services in the context of library and information services were found to be very positive, this study revealed, consistent with the study of Shonola and Joy (2014), that SVU's libraries, especially the DLIS's library, lack services related to the use of mobile devices in terms of the lack of information infrastructure and communication network, such as Wi-Fi networks, inadequate funding and regulatory issues.

Smartphone users perceived ease and usefulness of the use of smartphone devices was striking. They indicated that the use of the e-mail app, Google Mobile, Facebook app, WhatsApp, Kik, Twitter, YouTube, Google Maps, Viber, Line, Skype, Tango, Instagram, Flickr and Wikipedia Mobile were found to be at least fairly easy to them. According to Davis (1989), perceived ease of use has been found to influence the use of electronic devices, such as the computer. The easier a system is to use, the less effort will be needed to do tasks. In the context of smartphone devices, the authors propose that if they are easy to use, they require less effort on the part of users, thereby increasing the likelihood of their adoption and use. Additionally, smartphone users in this study indicated that the use of the e-mail app, Google Mobile, WhatsApp, Facebook, YouTube, Twitter, Viber, Instagram, Wikipedia Mobile, Google Maps, Kik, Skype, Line, Tango and Flickr were at least fairly useful to them, especially for the purpose of socialization more than learning. To some extent, this finding is confirmed by the study of Rhema and Sztendur (2013), who revealed that students perceive smartphones as a useful tool, but more for supporting their learning.

The main tasks performed on smartphone devices by students at SVU's DLIS were for socializing. Students indicated that popular activities, such as sending and receiving messages, following the news, making communications, making chat, making friends, finding specific information, finding general information, making discussion groups, playing games, completing class assignments, checking materials related to courses, doing business, seeking jobs, watching movies, listening to music and accessing library services are important tasks accomplished by them through the use of these devices. In agreement with Heo *et al.* (2010), most apps used by students at SVU's DLIS range from navigation software, services providing news and weather feeds, entertainment and games, to apps allowing users to access internet services, such as e-mail, Wikipedia, YouTube, Facebook and other social networking apps. Such apps, which are known as mobile social networking apps, allow students to connect with each other, as well as with others, such as family, relatives and friends. Similar to the study by White and Mills (2012), which revealed that students' attitudes towards the use of smartphone apps, especially for learning purposes have become more positive, the current study indicated positive attitudes towards the use of these apps. Students at least agreed with the statement that smartphone apps allow for easy dissemination of information, provide too much information, increase the speed of finding information, help communication, are convenient, secure, build confidence and reduce paper use. However, a large number of students agreed also at least with the statement that these apps are time consuming, intimidating, addictive, violate privacy, require high

language and technical skills, are harmful and frustrating. Almost all students confirmed that they are at least trustful in some apps, such as WhatsApp, e-mail, YouTube, Facebook, Flickr, Twitter and Viber.

Barriers to the use of apps included training, lack of appropriate apps, lack of the awareness of apps, lack of time needed to access apps, lack of language and technical skills needed for some apps, lack of the connection to the Internet needed to access apps, lack of the knowledge about apps and lack of adequate funds needed to purchase business apps were at least significant to smartphone users when accessing and using these apps. However, such barriers do not seem to prevent smartphone users from using these apps for socializing, although they might prevent them from using these apps for other purposes, such as for educational and academic reasons. "While there are many positives to the use of smartphones for educational purposes, there are still several obstacles to the implementation of mobile technology in the classroom" (White and Mills, 2012, p. 1). Anyanwu *et al.* (2012) found that students were pushed to use mobile devices, particularly smartphones, for various reasons, such as the lack of relevant information sources in libraries, saving of time and the cost of travelling to other libraries for research, a low level of satisfaction derived from available resources and lack of internet facilities in libraries. On the other hand, there were also barriers related to the use of smartphones, such as the high cost of downloading online resources, incompatibility of software/format of online resources and insecurity of sites, which may cause damage to the phones.

Recommendations for further research

The findings of this study revealed several areas that need to be addressed by further studies. Such findings may be used as a foundation for other researchers who wish to study how MITs are used among university students, especially LIS students. This study tried to cover all characteristics and aspects of using smartphones among students at SVU's DLIS that may affect their use. However, following the recommendations by Alfawareh and Jusoh (2014), further studies are needed to examine additional characteristics of using these mobile devices, particularly for academic practice. There is a need to better understand how these mobile devices can be used to contribute to student learning. This study tried to investigate student perceptions towards the use of smartphone apps in general. Further research may be needed to specify the relationship between the students' use of these apps and their academic performance.

Some of students surveyed in this study lacked awareness and knowledge about the capabilities and benefits of these devices and, thus, should be provided with a convenient environment to encourage and motivate them towards their use. Further research is needed to examine the digital divide between those smartphone non-users and users and to study why such disparity exists, as well as to explore possible solutions that could reduce this gap. In this regard, SVU's DLIS should create a non-threatening environment to reduce students' anxiety about the use of mobile devices, offer MIT literacy courses and design training workshops to use these tools effectively. Similarly, SVU's libraries should design and provide students with facilities to use mobile devices. This in turn may encourage mobile learning, which helps students personalize their smartphones to fit their interactions with others. In this regard, further research is needed to discover the possibility of the integration of mobile technologies into

education and library-related activities. Dresselhaus and Shrode (2012) tried to explore the extent to which libraries offer mobile access, their future plans for mobile implementation and their opinions about whether and how mobile technologies may be useful to library patrons. Students should also be provided with the necessary assistance to improve and promote their language and computer skills towards such usage. This study also recommends using smartphone apps, especially education apps, as a teaching tool to host learning-related materials and activities. Additionally, future studies may compare experiences of instructors and students regarding the use of SNSs in educational practices. Furthermore, new studies may look at how communicational uses of social networks have influenced educational uses.

As this study is the first one of its kind conducted about the use of smartphones by students at an Egyptian library school ($n = 17$) and in light of its descriptive nature, the research methodology used in this study may be the most suitable research method to reach the population of the study. However, for further research examining and investigating more specific information about these topics, other research methods, such as qualitative and experimental research, could be designed and conducted to measure the effectiveness of mobile learning in various disciplines. Finally, this survey research has limitations, as the sample included undergraduate students at only one university in Egypt. Future research could focus on varied contexts or samples, such as graduates or postgraduates, regions or countries.

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