

Learning with smartphones: a Hong Kong experience

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Summary

The study provides an overview of smartphone use for academic learning in higher education. The research was conducted on undergraduate and graduate students enrolled in Library and Information Science (LIS) study program at the University of Hong Kong. The research method is survey and an online questionnaire was used to collect data. The study findings show that LIS students commonly use smartphones for communication, socializing, entertainment, casual reading and other daily needs. They use smartphones for academic learning as well. Most frequent learning activities with smartphones are browsing and reading relevant materials on websites, watching videos, searching for information, using productivity tools and communicating with classmates. Major barriers to using smartphone for academic learning are the smartphone's small screen, websites not formatted for smartphones and long loading time.

Keywords: smartphones, higher education, mobile learning, library and information science

Introduction

Latest developments in mobile and wireless technologies opened up new opportunities to mobile devices owners for knowledge acquisition. Mobile technologies enable learners to access relevant information without time and location restrictions and to communicate easily with others. Although laptops are still the most often used mobile device for learning and study (Dahlstrom, Dziuban and Walker, 2014), smartphones and tablets are getting extremely popular among university students. Smartphones have recently become cheaper and more common among students in higher education, therefore, more students use smartphones for academic purposes (Dahlstrom *et al.*, 2014).

This study aims to provide an insight into smartphone use for academic learning by Library and Information Science (LIS) students from Hong Kong. An inquiry into students' smartphones use for their daily needs is included too, aspiring to provide some background information on smartphone use.

Literature review

There is an extensive literature on smartphone use for learning but only a limited number of studies look specifically at the use of smartphones by students in higher education. A study by Dahlstrom *et al.* (2014) conducted on a sample of 75,000 university students in USA reports a significant growth in students' smartphone use for academic learning over the period from 2012 to 2014. Students' learning activities with smartphones are mostly related to accessing a course management system for teaching materials, news, grades etc. Dresselhaus and Shrode (2012) looked at undergraduate and graduate students at one university in USA and found that 43% of study participants use smartphones for academic purposes daily or weekly. Bradley & Holley (2011) examined mobile phone use for academic learning by undergraduate students at London Metropolitan University and found that students use mobile phones to communicate with classmates, search for information, access learning materials, generate contents, record presentations and take notes. Bomhold (2013) found that more than two thirds of undergraduate students at one university in United States used smartphones for academic purposes, such as retrieving information with search engines and accessing online reference sources. On the other hand very few of these respondents used smartphones for searching library catalogs or subscription databases. Kim, Ilon and Altmann (2013) found that most of education and engineering university students at one Korean university widely used smartphones for learning purposes. Students use smartphones to search the Internet, check dictionary, view documents, translate texts, e-mail and text to classmates and teachers, take notes, manage schedules, access media and social networking websites.

A few studies on smartphone use for academic purposes involve higher education students from Hong Kong (Kukulka-Hulme, Pettit, Bradley, Herrington, Kennedy and Walker, 2011; Cheung, 2014; Dukic, Chiu and Lo, 2015). Kukulka-Hulme *et al.* (2011) explored the use of mobile devices for learning purposes from the learners' perspective on students in master and doctoral programs from Australia, Hong Kong, Portugal, Sweden and UK. The study shows that students in all five countries use mobile phones for learning-related activities like searching for information, reading e-books, listening to education materials, communicating with classmates, group work and collaboration, note taking and scheduling. According to Cheung (2014) undergraduate students in marketing and public relations at the Hong Kong Polytechnic University use smartphones to perform the following learning activities: sending emails to classmates, reading notes, searching Google Scholar, posting comments and uploading contents to the course website. Dukic *et al.* (2015) conducted a research on LIS postgraduate students from the University of Hong Kong and University of Tsukuba (Japan) and found that students rarely use smartphones for reading academic resources. They prefer to use smartphones for learning related activities like discussing assignments, accessing resources and news

from the course learning platform, checking course emails, etc. Use of smartphone for knowledge sharing and peer-based collaborative learning activities is also recognized in some other studies on mobile learning (Lippincott, 2010; Rambe & Bere, 2013; Liu et al., 2013).

From this brief literature review it can be concluded that students in higher education widely use mobile phones for academic learning. This is the only study that takes LIS students as subjects, so it will shed more light on this particular student profile.

Research questions

The main goals of this study is to investigate the scope of LIS students' use of smartphone for academic learning purposes, to detect what specific learning activities students perform with their smartphones and to identify possible barriers to smartphone use for learning. The major research questions are listed below:

1. To what extent LIS students use smartphones for academic leaning?
2. What typical learning related activities do LIS students perform with smartphones?
3. What are possible barriers to LIS students' smartphones use for learning?

Research method

The research method applied in this study is survey and an online questionnaire is used to collect data. The questionnaire included seventeen questions, fifteen closed-ended questions and two open-ended questions, all arranged in three parts. In the first part we collected data on respondents' demographic characteristics, on some general features of their smartphones and on circumstances of smartphone use. The second part examined participants' smartphone use for everyday needs. The third part of the questionnaire gathered data on participants' activities with smartphone related to learning and study needs. This part also looked at possible barriers to smartphone use for learning. Most of questions in the second and third part applied a Likert scale.

The study was conducted on LIS students enrolled in bachelor and master program at the University of Hong Kong. The questionnaire was posted to the online polling platform *SurveyMonkey* and the link to the questionnaire was sent to students by email. The participation in the research was voluntary and anonymous. Ethical Clearance for this research was obtained from the Human Research Ethics Committee for Non-Clinical Faculties of the University of Hong Kong. Data were collected during the spring and autumn academic terms in 2014. Ninety-three valid responses were received.

Findings and discussion

Major demographic characteristics of study participants can be seen in Table 1. The data show that there are more female students than male students. Only a few of study participants are in the age group ranging from 41 to 50. The percentage of master students is slightly higher than bachelor students. Comparing the age and study level our data show that 43% of students in the age group up to 30 are master students while in the age group from 31 to 40 master students make 77%. It can be noticed that 33% in the sample are mature bachelor students.

Table 1. Gender, age and study level

Gender		Age		Study level	
Male	35%	20 - 30	54%	Bachelor degree	42%
Female	65%	31 - 40	43%	Master degree	58%
		41 - 50	3%		

When study participants were asked how often they accessed the Internet with their smartphones, it turned out that even when a computer with Internet access was easily available most of them used smartphones. Our data show that 51% of study participants use the Internet from smartphone ‘very often’, 20% do it ‘often’, 22% ‘sometimes’ and only 7% ‘rarely’. Of course, smartphones can’t replace computers in performing many complex tasks but it is obvious that smartphones are widely used to supplement computer use for completing some simpler activities.

Smartphone use for everyday needs

Daily smartphone activities are considered to be a good indicator of study participants’ general acceptance of smartphones. Therefore an insight into LIS students’ smartphone use for their everyday needs helps us better understand their smartphone use for learning purposes.

Table 2. Smartphone activities for everyday needs

Types of activities	Daily/weekly
Communicate with friends & family (e.g. email, SMS, chat)	95%
Use search engines (e.g. Google, Yahoo, Baidu)	89%
Social activities with social media (e.g. Facebook, Twitter)	83%
Games, music, movies, TV series, etc.	82%
Using productivity tools (e.g. calendar, notes, to-do lists)	75%
Finding locations, like streets, restaurants etc.	59%
Accessing reference sources (e.g. encyclopedia, dictionary)	52%
Hobbies, sports, fitness, travel	46%
Casual reading: books, comics, magazines, newspapers, etc.	75%
Academic reading: articles, e-books, blogs, websites	40%

The study shows (Table 2) that LIS students extensively use their smartphones for various daily needs. Most of them regularly use smartphones for talking, sending email, texting or chatting. Further, they often communicate with friends and family through social media and also use search engines. Other highly popular activities involve entertainment, casual reading and using productivity tools. Data in Table 2 show that 75% of LIS students read casual literature such as books, comics, magazines etc. This finding supports the findings from the study by Dukic et al.(2015) that reading novels and comics with smartphones is very popular among Hong Kong students. Academic reading with smartphone is less popular than casual reading, but still up to 40% of LIS students read academic literature on daily or weekly basis. These findings go in line with the findings in studies by Kukulska-Hulme *et al.* (2011), Bomhold (2013) and Cheung (2014).

Smartphone use for learning purposes

Study findings on LIS students' smartphone activities related to learning and study are organized under four major categories:

- communication and sharing
- browsing, reading, viewing and listening
- searching and accessing information and
- using productivity tools and recording

The research results (Table 3) indicate that more than half of study participants use their smartphones to discuss various study related issues with classmates or teachers. It is interesting that they do it more often by email or texting (SMS/MMS) than by talking on the phone. Less often LIS students share their learning experience on the official course management platform such as Moodle or on some other social networking websites.

Table 3. Smartphone use to communicate and share (talking, texting, posting) for learning

Types of activities	Daily/weekly
Talking to classmates to discuss course materials, assignment etc.	58%
Using email, SMS, MMS or chat apps for study related issues with classmates/teachers	62%
Posting to class forums on the learning management platform (e.g. Moodle)	26%
Posting or commenting study related items to social networking sites (e.g. Facebook, Twitter)	33%

Findings about using smartphones for study related communication and sharing with classmates emphasize the role of smartphone technology in facilitating collaborative learning. A qualitative research conducted by Dukic *et al.* (2015) also found that smartphones are very effective for students' collaboration and sharing for study purposes as well.

From data in Table 4 it can be seen that a high percentage of LIS students browse daily or weekly through various websites on their smartphones for learning purposes. Browsing or reading posts on social networking sites is even more popular. Data indicate that 85% of study participants report using smartphones for learning related activities through social networking sites. These findings are not surprising because research on mobile learning already recognized the close connection between smartphone and social media (Gikas and Grant, 2013). On the other hand, it surprises that only 24% of students access learning management platform with smartphones on daily or weekly basis. This result differs significantly from finding in the study by Dahlstrom *et al.* (2013) showing that over 80% of students use their smartphones to access course manage systems for their learning related needs.

Table 4. Smartphone use for browsing, reading, viewing and listening for learning purposes

Types of activities	Daily/weekly
Browsing through websites, blogs, wikis, micro-blogs etc.	68%
Browsing or reading posts on social networking sites (e.g. Facebook)	85%
Reading articles from academic journals & magazines	22%
Reading e-books	23%
Viewing a video clip (from YouTube, TED talks or similar)	55%
Accessing learning management platform for information or resources (e.g. Moodle)	24%

Using smartphones to watch videos for learning purposes is also popular among LIS students. More than half of respondents watch YouTube, TED talks or some other learning related videos daily or weekly. Less popular is reading academic journals and e-books. In our study only 22 % read academic journals and 23 % read e-books on their smartphones. Students participating in the research by Dukic *et al.* (2015) argue that they prefer to read academic works at their desk at home where they can fully concentrate on the task. Smartphones are usually used *on-the-go*, in the environment that might be distractive and thus not suitable for serious academic work. It is worth mentioning that our data on reading academic journals and e-books differ from findings in study by Kukulska-Hulme *et al.* (2011) where 43 % of Hong Kong students report reading e-books and 35 % reading academic journals with smartphones once a week or more often. An explanation for these disparate findings might be that study participants from Hong Kong in the study by Kukulska-Hulme *et al.* (2011) were science students and that disciplinary profile influences smartphone use for learning.

Table 5. Using smartphone for searching and accessing information for learning

Types of activities	Daily/Weekly
Accessing and searching library catalog	28%
Accessing and searching e-databases	20%
Accessing reference sources (e.g. encyclopedia, dictionary)	44%
Searching with search engines (e.g. Google, Yahoo etc.)	79%

When it comes to information search for learning and study purposes our data show that the most popular searching tools in smartphone use are search engines (Table 5). No less than 79 % of study participants use search engines such as Google, Chrome or Safari to find information for learning purposes. It is interesting that LIS students search library catalog or electronic database with their smartphones less often. Some other studies on mobile learning also report low percentage of searching library resources with smartphones (Dresselhaus and Shrode, 2012; Bomhold, 2013) but they mostly involve students from various disciplines. Since our study focus on LIS students (future librarians), it would be expected that they would be familiar with all advantages of library resources and that they would use these sources in higher proportion. It is worth mentioning here that academic libraries in Hong Kong provide collections rich with electronic resources with user-friendly retrieval interface, which also includes mobile access.

Table 6. Using smartphone productivity tools and recording capabilities for learning

Types of activities	Daily/Weekly
Planning personal schedule (e.g. Google calendar, organizers)	55%
Making notes with note taking tools (e.g. Evernote)	45%
Creating documents (e.g. text, presentation, spreadsheets)	21%
Taking photos to record learning materials (e.g. book pages, slides)	45%
Audio recording presentations, seminars, interview, etc.	28%

More than half of LIS students (Table 6) use smartphones for planning their personal schedules and organizing daily and weekly activities, and a little less than half use note-taking tools. It can also be seen that only 21% create documents with their smartphones weekly or more often. This result does not surprise if we keep in mind how difficult is to type and edit on a small smartphone screen. Smartphone functionality of taking photos is often performed by 45% of respondents while audio recording is performed only by 28% of respondents. Video recording with smartphone is very rarely used for learning and study purposes so it is dropped from Table 6.

According to study findings a major barrier to smartphone use for learning is the small size of smartphone screen (Table 7). Small screen also makes it difficult to read academic papers and also to write and edit longer texts. Difficulties in interacting with a small screen are also reported in some other studies (Ku-

kulska-Hulme *et al.*, 2011). Another barrier for many respondents is that webpages are not always formatted for smartphone. Slow load time also discourages our study participants from using smartphones for learning purposes. These barriers can to a certain extent explain LIS students' behavior. For instance, the low percentage of participants reading academic papers and e-books on their smartphones can be easily explained by difficult reading from small screen.

Table 7. Barriers to smartphone use for learning

Types of barriers	Medium/high barrier
Screen size is too small	87%
Reading is difficult	82%
Typing is difficult	72%
Web page is not formatted for smartphone	86%
Load time is slow	72%

Conclusion

The results of this study demonstrate that LIS students from Hong Kong extensively use smartphone applications for their day-to-day needs. They use smartphones for communication and socializing, for finding information, entertainment, leisure, and for managing their daily and weekly activities.

LIS students also use their smartphones for learning and study purposes. They often use smartphones for browsing and reading study related materials found on the Internet and watch video clips from social media websites. However, smartphones are used less frequently for reading academic resources such as academic journals and e-books. Therefore, it can be concluded that LIS students are less inclined to read lengthy and more complex materials with their smartphones.

It further transpires that smartphones are commonly used for communication with classmates and discussing study related issues, such as course group activities and assignments. Therefore, smartphones can be considered as facilitators of collaborative learning.

When it comes to retrieving and accessing information for academic purposes LIS students still prefer search engines to library resources. It is surprising that even future librarians underuse library resources although they are aware that subscription databases are more reliable resources for academic literature than search engines.

Major barriers to smartphone use for academic learning reported by study participants are small screen which makes it difficult to read and type, absence of smartphone friendly webpages and too long loading time.

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