Investigating Acceptance towards Mobile Learning in Higher Education Students

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Abstract. Mobile learning or M-learning brings a new aspect of learning environment. Due to the large amount of available applications in mobile devices, students use their mobile devices for many purposes including entertainment, sharing, communication, video recording, photo shooting and learning. The acceptance toward mobile learning has naturally become a major interest for educators. In this paper, we will present preliminary findings from a small scale study exploring the students' experiences on using mobile devices versus desktop computers, as well as perceptions towards mobile learning. The data are obtained from the quantitative survey. The preliminary findings indicate that students will use mobile devices rather than desktops to access the Internet. Students are willing to use mobile devices to conduct learning activities.

Keywords: Mobile learning, e-learning, mobile technology, motivation, cyber behavior, learning activities.

1 Introduction

We have seen the processing power of mobile technology grown exponentially while becoming more affordable and even ubiquitous. According to a report from CNNMoney [1] on February 28, 2014, Americans used smartphone and tablet apps more than PCs to access the Internet last month. It is obvious that mobile devices have been overtaking desktop computers and will dominate the future Internet. The current 4th-generation mobile technologies are so powerful that making mobile devices can serve as a tablet, notebook, PDA, telephone, or camera, and data transference as well as video and audio files. In this way, the growth and popularity of mobile applications have been profoundly impacting on our daily life, including learning activities. Mobile technology seems to open a big door for a new kind of learning and performance support in teaching and learning. Students not only learn at school, but also learn informally when they are out of school. Students can use their mobile devices to enhance learning anywhere at any time: waiting for bus, travelling on train, dinning at restaurant, etc. Since mobile devices are increasingly used for learning in classrooms, researches on mobile learning have been becoming a major interest for educators [2]. This study is to explore the students' experiences on using mobile devices versus desktop computers, as well as students' perceptions towards mobile learning.

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2 Mobile Learning in Education

Mobile learning or M-learning can be broadly defined as the exploitation of ubiquitous handheld technologies, together with wireless and mobile phone networks, to facilitate, support, enhance and extend the reach of teaching and learning [3]. Many schools recognized that mobile devices are important learning tools for a vast range of classroom application [4]. To enhance learning, mobile devices can provide educational opportunities for students to access course content, as well as interact with instructors and classmates wherever they are located [5]. A study from the Educause Center for Applied Research [6] indicated that 67% of surveyed undergraduate students believed that mobile devices were important to their academic success. They would use their mobile devices for academic activities. They are also driving the adoption of mobile devices, such as smartphones and tablet computers, in higher education. In this way, mobile learning is an expanded form of e-learning for the use of mobile devices that involves connectivity for downloading, uploading and online working via Wi-Fi or mobile networks, and linking to institutional e-learning systems [7].

3 Research Methodology

In this study, students' experiences and perceptions on mobile learning versus desktop computers were investigated. It used a convenient sampling method to collect the data. It was conducted in the academic year 2013-14, 68 students were invited to participate in this research. They were enrolled in a course called "Mathematics", one of the core curriculum courses required for all students who are pursuing a post-secondary programme in the Institute. They were invited to complete a questionnaire about their experiences and perceptions on mobile learning on voluntary basis.

3.1 Research Questions

This study attempts to answer the following research questions:

- What are general experiences of students in using the mobile devices versus desktop computer?
- What is students' perception on using the mobile devices for academic activities?
- What are students' attitudes on using the mobile devices for academic activities?

3.2 Data Collection

A questionnaire was developed and distributed to students during the spring semester in academic year 2013-14. Participation in the survey was on voluntary basis and all responses were anonymous. The survey comprised of a combination of Likert scaled, and ranking scaled questions. When the data were collected, the later analysis would be based on descriptive statistics, frequency distribution and correlation.

4 Preliminary Findings

68 of the students enrolled in the post-secondary programme took part in this survey. The survey included four broad types of measures: demographic information, daily Internet usage habits using personal computers (PC) and mobile devices, daily e-learning activities, and students' attitudes on using mobile devices for learning. The survey data were analyzed by the "SPSS" software. In our sample, 59% and 41% of the students were male and female respectively. 97% of respondents were below 25 years old, about 77% of them were 18 to 20 and 20% of them were 21 to 24.

From the survey, 49% of the students spent 3 hours or more daily on the Internet through PC. However, 79% of the students spent 3 hours or more daily on the Internet through mobile devices. The distribution of students' Internet daily usage on using PC versus mobile devices was shown in Figure 1. In the usual place to get the Internet access measure, students could choose more than one option in this item. From the result, the most popular place to access the Internet through PC was at home and 55 students chose this item. The most popular place to access the Internet through mobile devices was at campus and 61 students chose this item. The distribution of popular places to access the Internet was shown in Figure 2.

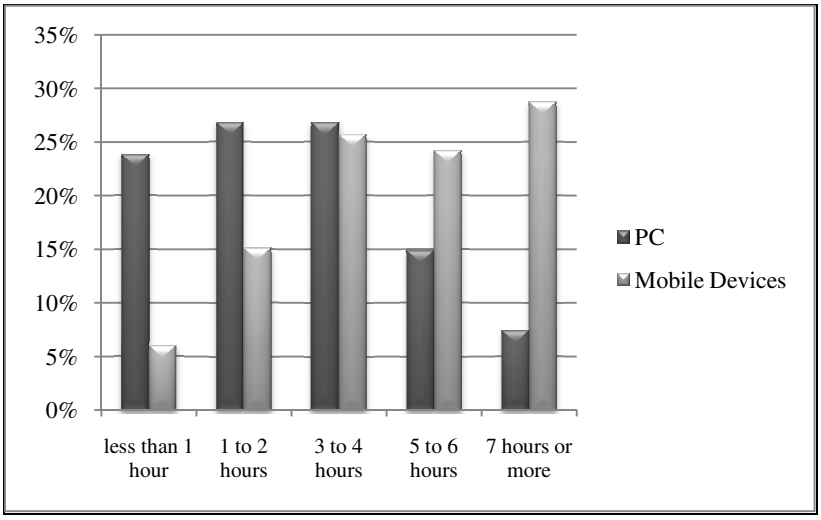

Fig. 1. The distributions of students' Internet daily usage on using PC versus mobile devices

In the e-learning activities measure, most of daily e-learning activities on PCs are searching information and downloading documents. On the other hand, most of daily e-learning activities on mobile devices are searching information and discussing assignments, as shown in Figure 3.

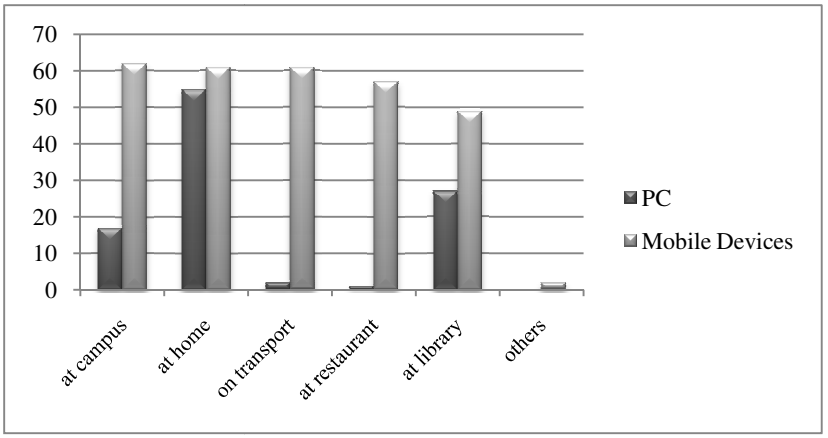

Fig. 2. The distributions of popular places to access the Internet on using PC versus mobile devices

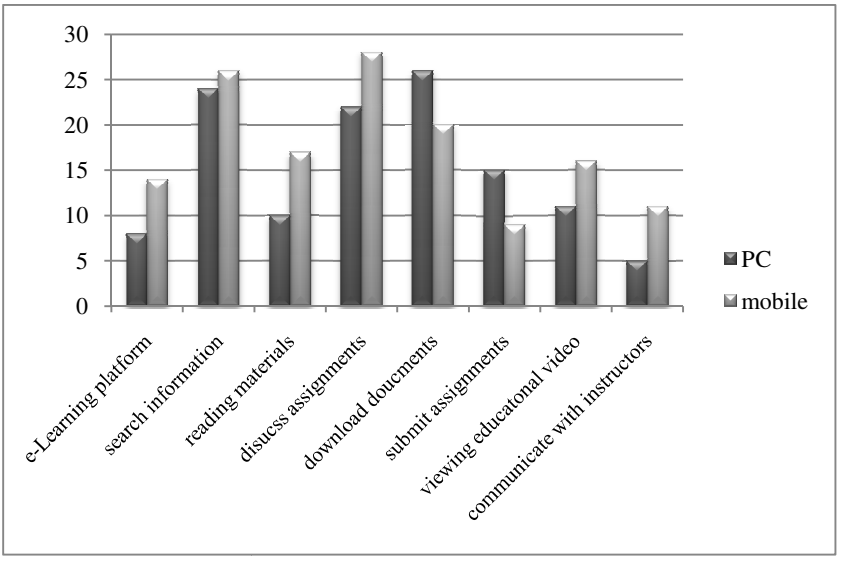

Fig. 3. The distributions of daily e-learning activities on using PC versus mobile devices

For the student's' perceptions on mobile learning, 68% of the students agreed or strongly agreed that using mobile devices for learning can enhance their study effectively, as shown in Figure 4. 87% of the students agreed or strongly agreed that using mobile devices are convenient to access information anywhere anytime.

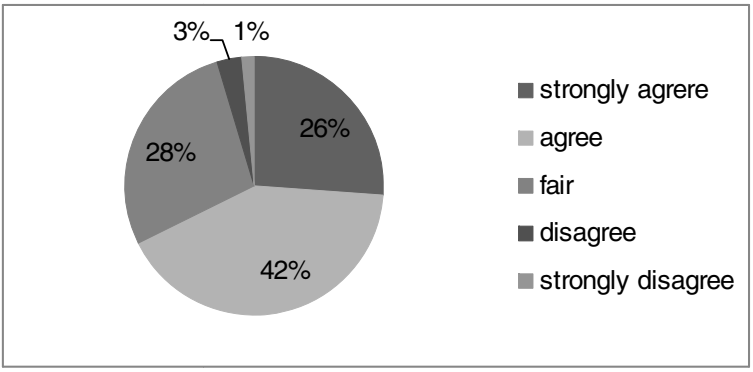

Fig. 4. The distributions of students' perceptions on mobile learning

In the activities on mobile devices measures, 54 students reported that they were using Whatsapp daily or almost daily for communicating with friends. 45 and 38 students used mobile devices for information surfing and reading news respectively. The distributions of the daily activities of using mobile devices were shown in Figure 5.

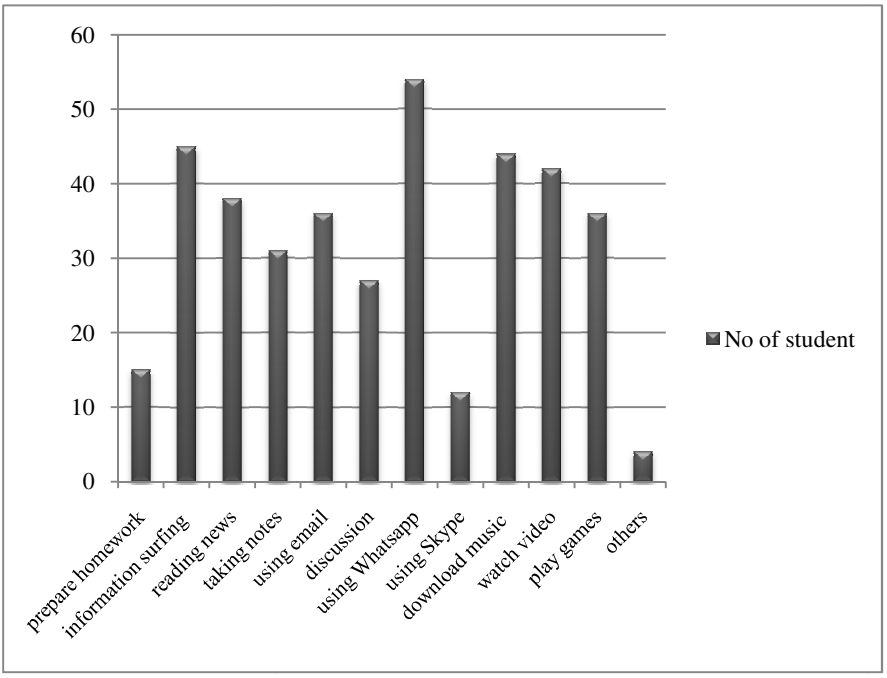

Fig. 5. The distributions of daily activities on using mobile devices

Table 1. The summary of the questions (5-point Likert scale) in the survey

	Questions	Mean Score	Standard Deviation
1.	In contrast with PC, I will spend more time on using mobile devices for Internet.	3.69	1.144
2.	In contrast with PC, I prefer to use mobile devices for Internet.	3.46	1.078
3.	In contrast with PC, I prefer to use mobile devices for learning.	3.55	1.049
4.	In contrast with PC, I prefer to use mobile devices for discussing assignments with classmates.	3.75	1.049
5.	In contrast with PC, I prefer to use mobile devices as an e-Learning tool.	3.31	1.076
6.	In contrast with PC, I prefer to use mobile devices for conducting learning tasks.	3.45	1.034
7.	In contrast with PC, I prefer to use mobile devices to view learning materials.	3.27	1.075
8.	In contrast with PC, I prefer to use mobile devices for conducting quiz.	3.13	1.072
9.	In contrast with PC, I prefer to use mobile devices for watching learning video.	3.31	1.104
	Average	3.43	1.07

A total of 9 items were used to measure the students' attitudes on learning through mobile devices versus PC, Table 1 shows the summary of findings. The results showed average ratings of 3.43 on a five point Likert scale and all items were higher than the average. The results indicated that students would prefer using mobile devices for discussing assignments with classmates. The average mean of this item was the highest score 3.75 out of 5. Regarding the students' attitudes on using institute's mobile apps, 58% of students agreed or strongly agreed that instructors can design more learning activities through mobile apps. 64% of students agreed or strongly agreed that our institute should develop more mobile apps for them to enhance their learning, details as shown in Table 2. Furthermore, it is found that 9 items related to "students' attitudes on learning through mobile devices versus PC" and 2 items related to "students' attitudes on using institute's mobile apps" could be combined into one factor. The factor named "M-learning attitude" was formed. The Cronbach's alpha of these items was 0.935, as shown in Table 3. These items were significantly related.

Regarding the students' attitude of using institute's mobile apps, 74% of students reflected that they were willing to use our institute's mobile apps for reading and learning. This finding echoes the research results from [6].

Table 2. Students' attitudes on using institute's mobile apps

	Questions	Strongly agree	Agree	Fair	Disagree	Strongly disagree
1.	wish instructors can design more learning activitie sing mobile apps.	17%	41%	30%	9%	3%
2.	wish our institute can develop more mobile apps or us to enhance learning.	23%	41%	29%	4%	3%

Table 3. The Cronbach's alpha of the 11 items related to students' attitude towards social networking for learning

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
.935	.935	11

Table 4. The correlation among the items related to students' spending time on mobile devices and perceptions

		Spending time on Internet using mobile devices	Spending Time on learning using mobile devices	Enhance learning effectively
Spending time on Internet using mobile devices	Pearson Correlation	1	.006	.241*
	Sig. (2-tailed)		.963	.049
	N	68	68	67
Spending Time on learning using mobile devices	Pearson Correlation	.006	1	.325**
	Sig. (2-tailed)	.963		.007
	N	68	68	67
Enhance learning effectively	Pearson Correlation	.241*	.325**	1
	Sig. (2-tailed)	.049	.007	
	N	67	67	67

*. Correlation is significant at the 0.05 level (2-tailed).

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

5 Discussion

This study provided a useful view of what students are currently doing and of what they can do with mobile devices regarding learning. It has provided valuable insights for the mobile learning. The results of the survey indicate that the majority of the students perfered using mobile devices to conduct learning activities. It is hypothesized that students would benefit from the mobile learning.

For the general experiences of students on using the mobile devices versus desktop computers, the finding seems confirm the trend that people used more mobile devices than PC to access the Internet daily. In contrast with PC, students prefer using mobile devices to perform more activities, including academic activities. The reasons why students like using mobile technology as a learning tool may be simply their habits or daily usual rituals. We may conclude that mobile devices become necessities for our daily life and people are willing to spend more time there. We can forecast that mobile learning will play a dominant role in e-Learning in the near future.

For the second research question, the findings may indicate that students generally have positive views towards the use of mobile devices for learning, particularly that accessing information conveniently (38% of students agreed and 49% of students strongly agreed) as well as enhancing learning effectively (42% of students agreed and 26% of students strongly agreed). Moreover, the items "mobile devices can effectively enhance learning", "students spending time on learning through mobile devices" and "students spending time on the Internet through mobile devices" are significantly correlated, as shown in Table 4. It seems that those respondents who are frequently using mobile devices will be more eager to use mobile technologies as their learning tool.

For the third research question, the findings may reflect that students generally have positive attitudes towards the use of mobile devices for learning. On the other hand, we further analyzed the items "Spending time on Internet using mobile", "Enhance learning effectively" and "M-learning attitude". The results show that they are significantly correlated, as shown in Table 5. These findings also demonstrated that students have positive views towards mobile learning and they may also have positive attitudes.

Table 5. The correlation among the items related to students' spending time on mobile devices, perceptions and attitudes

		Enhance learning effectively	Spending time on Internet using mobile	M-learning attitude
Enhance learning effectively	Pearson Correlation	1	.617**	.519**
	Sig. (2-tailed)		.000	.000
	N	67	67	67
Spending time on Internet using mobile	Pearson Correlation	.617**	1	.485**
	Sig. (2-tailed)	.000		.000
	N	67	67	67
M-learning attitude	Pearson Correlation	.519**	.485**	1
	Sig. (2-tailed)	.000	.000	
	N	67	67	67

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

However, in terms of academic performance, no significant relations were demonstrated between the students with positive attitudes and their academic performance. We analyze the items related to students' attitudes towards mobile learning and examination results of English and Mathematics in the last semester. The results indicate that Mathematics and English examination results are significantly correlated; however, there are no significantly correlations between the examination results and students' attitudes, as shown in Table 6. It may be due to the lack of academic activities designed for mobile learning. However, students are eager to wish that our

instructors can design more learning activities through mobile apps. They also hope that the institute develops more mobile apps for them to enhance learning. For this reason, we have developed our own Mobile Native App for language learning. The mobile app allows end users to download and access learning materials anywhere and anytime, so that language learning is no longer constrained by the limited time and space. In the preliminary results, students reported that the mobile app could help them review their understanding and concepts of particular subjects. The app system is user-friendly and efficiently [8]. It is hypothesized that the students' acceptance towards on mobile learning is increasing.

Table 6. No significantly correlations found in students' attitude and their academic performance

		M-learning attitude	Mathematics Examination Results	English Examination Results
M-learning attitude	Pearson Correlation	1	-.153	-.044
	Sig. (2-tailed)		.217	.728
	N	67	67	65
Mathematics Examination Results	Pearson Correlation	-.153	1	.374**
	Sig. (2-tailed)	.217		.002
	N	67	67	65
English Examination Results	Pearson Correlation	-.044	.374**	1
	Sig. (2-tailed)	.728	.002	
	N	65	65	66

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

Although findings have indicated that students are likely to use mobile devices to perform academic activities, this study still has some limitations. Firstly, the participant size was small that only 68 students participated in this study. Secondly, the respondents were limited to students in sub-degree programme. As most of them intended to pursue a higher diploma or even degree programme in the near future, tracing their further learning path would better reflect the effectiveness of mobile learning. Thirdly, as all the samples were drawn from a self-financing post-secondary institute in Hong Kong, it would be doubtful whether it was a fair picture for other students in other institutes in Hong Kong. In this way, conducting another study with students coming from other institutes in Hong Kong would be highly recommended. Finally, the findings would be more convincing and reliable if the study could include an empirical practice in mobile learning.

6 Conclusion

This study has demonstrated that the mobile learning may be effective on enhancing students´ learning in terms of students´ experiences and perception. The significance of the research lies in three ways. Firstly, the study has confirmed that students gener-

ally use mobile devices which are becoming necessities on daily life. Secondly, the finding has indicated that students' perceptions are towards mobile learning. Thirdly, students' attitudes are also positive towards on mobile learning.

The finding of this study suggests that mobile technologies have the potential to provide new learning experiences. In this study, students felt that mobile devices will have great potential to replace desktop computers on conducting learning. Other researchers [9][10][11] have reported positive reactions of students on using mobile devices for language learning because of the portability and perceived convenience. However, there are also some limitations; for example, students might have limited access to mobile devices due to device and service costs. Some students may frustrate with new technology when using it as a learning tool. Moreover, small screen size of mobile phones may limit the mobile content presented.

The Mobile technologies are perceived as an effective tool in improving communication and learning [12]. As more students make use of mobile learning, they become more comfortable with using mobile devices for learning. We can see empowerments in adopting new technology in their study. Educators should be more likely to use mobile devices for pedagogical purposes in their future classes. Finally, mobile learning is certainly an interesting approach in learning. The world of learning will become more mobile, more flexible and more exciting. The mobile learning age is approaching.

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