

Chapter 9

Preference and Readiness of Nursing Students for Mobile Learning



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Abstract Nursing education stresses the importance of theoretical and practical integration. Teaching and learning activities occur both in classroom and clinical venue. Owing to these characteristics, nursing education has to be delivered in a flexible way and mobile learning appears to be a desirable means. In order to achieve effective learning outcome from mobile learning, one of the essential issues is to deliver mobile learning that meet the preferences and readiness of nursing students. This paper presents a survey which aimed to investigate the preference of nursing students for engaging in mobile learning and their readiness to adopt this learning mode. A convenience sample of 158 full-time undergraduate nursing students at The Open University of Hong Kong was recruited. Data were collected by a questionnaire. The survey results revealed that nursing students would like to access their learning materials anytime and anywhere. The nursing students considered ‘ease of reading’ and ‘ease of note-taking and highlighting’ as the most important factors that determined their use of electronic learning materials. They further considered ‘level of comfort in reading’, ‘portability’ and ‘input and output capabilities’ as the three most important factors in using a mobile device for learning. Among the different study topics, they highly preferred to have body systems and diseases as well as medical terminology to be provided in multimedia materials in the mobile device. Based on these findings, the challenges and opportunities of mobile learning in nursing education are discussed. Unique features of mobile learning for nursing education are suggested.

Keywords Mobile learning · Nursing education · M-learning readiness

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Introduction

Mobile learning has been regarded as one of the promising means of education delivery. It allows learning to take place across different settings beyond geographical barriers and time constraints. As a young but rapidly growing field playing an increasingly important role in education (UNESCO, 2012), it is regarded that mobile learning may benefit learners in multiple ways. For example, it allows learners to vary the location of their study and to learn ‘on the move’ (Evans, 2008). Learners may learn within a specific context, which provides authentic cultural and environmental cues for understanding the utilisation of information and thus enhances the retention, retrieval and transfer of the information for practical use (Koole, 2009). In addition to individual learning, mobile learning also facilitates social interaction among learners and teachers, through applications such as text messaging or voice communication (Uzunboylu & Ozdamli, 2011).

With the growing popularity of mobile devices, the development of mobile learning has been gaining momentum. Nursing education emphasises acquisition of both conceptual knowledge and practical skills in classrooms and clinical venues. The different learning environments of nursing education provide a suitable platform for mobile technology to take effect. The use of mobile devices enables provision of up-to-date and accurate content and supports situated, experiential and contextualised learning in the context of nursing education (Kukulka-Hulme & Traxler, 2005).

Success in provision of mobile learning requires purposeful and thoughtful planning. Baker, Dede and Evans (2014) summarise a wide range of areas that have to be taken into account in the planning of mobile learning, such as the learning goals to be accomplished, prior knowledge and skills of learners and teachers, instructional and curricular materials to be developed and their ways of delivery via mobile devices. Prior to implementation, studies are thus needed for an institution to assess how well its students and staff are ready for mobile learning.

This paper presents a survey on the preferences of nursing students for mobile learning and their readiness to adopt this learning mode. The findings show the relevant support required, which facilitate course designers and teachers to plan and deliver mobile learning in a way addressing students’ specific needs. This study also reveals how mobile learning may be integrated into a conventional classroom setting so as to achieve a high level of learning and teaching effectiveness.

Mobile Learning for Nursing Students

This study focused on the practice of mobile learning in nursing education at The Open University of Hong Kong (OUHK). OUHK has been leveraging mobile technologies for clinical education support as far back as 2004. Mobile and wireless technologies were applied to remove the physical barriers associated with classroom

learning (Lee & Tsang, 2006). The nursing programmes at OUHK have in recent years been making use of iPod touch in their clinical practicum, in order to facilitate teaching and support learning. Equipped with the mobile devices, nursing students can access the learning materials anywhere and anytime and feasibly complete their clinical assessment.

Based on this successful experience, the university is planning to extend the provision of mobile learning to the classroom setting of nursing courses. An iPad mini will be given to each nursing student for learning purposes in the 5-year curriculum. Specific features are planned to be built into the mobile learning environment of the nursing courses, such as electronic database of nursing information, assessment/performance record, video clips, classroom attendance, ePortfolio, real-time quizzes, news announcements and reminders. These features are designed to enhance students' learning and interaction and to relieve teaching staff of their administrative burden.

A survey was conducted to collect nursing students' preferences and their readiness for mobile learning, so as to understand the mobile contents and ways of delivery suitable for them. It assessed the extent to which the nursing students are ready for adopting mobile learning, their preferences of mobile contents and their preferred ways of mobile learning. Such understandings are crucial to the planning, development and implementation of mobile learning in nursing education.

Related Studies

There are a broad range of dimensions suggested in the literature regarding students' readiness for mobile learning. For example, Parasuraman (2000) raised the notion of technology readiness, defined as 'people's propensity to embrace and use new technologies for accomplishing goals in home life and at work' (p. 308). Cheon, Sangno, Crooks and Song (2012) explained students' intention to adopt mobile learning based on the theory of planned behaviour (Ajzen, 1991), with constructs of perceived behavioural control, attitude and subjective norm. Kenny, Van Neste-Kenny, Burton, Park and Qayyum (2012) used mobile self-efficacy as an indicator to measure students' readiness to engage in mobile learning. They observed a tendency to mobile learning engagement that would emerge as a result of one using more frequently mobile devices, i.e. the more one uses the devices, the more self-efficacy one would be, and in turn more usage of the devices is encouraged.

Hussin, Manap, Amir and Krish (2012) categorised mobile learning readiness into five types, namely, basic readiness, skills readiness, psychological readiness, budget readiness and institutional readiness.

Basic readiness is related to students' ownership of devices, as well as features of the devices such as storage capacity and networking functions. It also includes device capability of running mobile apps for tasks such as reading PDF or PowerPoint files. Kenny et al. (2009) also noted that 'access to and usability of

mobile learning devices is critical to supporting the context of learning and learning interactions' (p. 94).

Skills readiness refers to familiarity of students to perform various tasks using the mobile devices, such as sending and receiving e-mails or files, accessing social networking sites and reading online news. Hamat, Embi, and Hassan (2012) found that skills readiness is positively correlated with students' prospect of engaging in mobile learning. So (2008) also reported that acceptance of mobile phones for teaching and learning has a direct relationship with students' daily uses of mobile phones.

Psychological readiness examines students' understanding and perception of mobile learning. In this dimension, Cheon et al. (2012) commented that inclusion of contents or materials mostly desired by students might be helpful to achieve a high level of perceived usefulness of mobile learning. For example, they found students regarded course information (e.g. schedulers and exam results) as the most desired function. Abas, Chng, and Mansor (2009) found that students of the Open University Malaysia preferred to have reminders of important events and study tips, as well as learning materials such as online tutorials and quizzes.

Institutional readiness concerns students' perceptions of whether the university and teachers are ready to offer mobile learning. Hamat et al. (2012) identified three most important factors for successful implementation of mobile learning, including integration of mobile contents with the existing e-learning platform of the university, complementary role to conventional teaching and well-designed interface of mobile devices for convenient access of materials.

Budget readiness regards willingness of students to bear extra cost for mobile learning. Hussin et al. (2012) showed that students are mindful of additional financial costs that might have incurred in the practice of mobile learning. Abas et al. (2009) revealed that students are cost-aware and not willing to spend extra money on mobile learning. Kenny et al. (2012) also noted that a major barrier to implement mobile learning is the party responsible for the associated cost of purchasing mobile devices and connecting to mobile network.

These dimensions suggest the wide range of areas to be taken into account in the planning and development stages, which are addressed in this survey studying the preferences and readiness of nursing students for mobile learning.

Research Method

This study aimed to investigate the preference and readiness of nursing students for mobile learning. Using a convenience sampling, the students who participated in the study were year 2 undergraduate nursing students from a course entitled Health Assessment, who did not practice mobile learning yet. Two focus group interviews had been carried out in advance to collect 20 students' views and experience on their study of nursing courses and mobile learning. The focus group findings were used to develop a questionnaire for the survey.

The survey was conducted in December 2014. A total of 158 responses were collected, with 80.4% of female respondents and 19.6% of males. Upon obtaining their consent to participate in the study, the students were asked to indicate their preference for a wide number of areas related to mobile learning, such as mobile device, electronic material and means of communication.

Findings

The findings of the survey are presented with reference to the dimensions of mobile learning readiness from Hussin et al. (2012) relevant to our context, i.e. skills readiness and psychological readiness.

Skills Readiness

Table 9.1 shows the familiarity of students with mobile devices using iOS, i.e. the operation system of mobile device to be given to students (using a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree)). Despite the fact that they may own different types of mobile devices, the students generally indicated a moderate familiarity with devices running iOS. The students are expected to possess the skills for tasks such as using e-mail services, accessing Wi-Fi network, uploading and downloading files and reading online materials.

The results show that the students are in general more familiar with iPad/iPad mini than iPod touch and iPhone. As the students will be given iPad mini for mobile learning, this implies that they would not have great difficulty in adapting the device for learning purposes.

Table 9.2 reports the version of textbook owned by the students which is used in the nursing course. Most of the students (61.2% in total) owned either the electronic version or both electronic and printed versions. According to Hamat et al. (2012), students' familiarity with electronic materials would result in a favourable attitude to mobile learning.

Tables 9.3 and 9.4 show the students' preference in means of communication with teachers and classmates on academic matters, respectively. A ranking scale is used from 1 (most preferred) to 9 (least preferred). The results show that most students favour face-to-face interaction with both teachers and fellow classmates. Other than this, the students appear to have little barrier to use mobile devices for communication, especially instant messaging which ranks the second or third for both student-to-teacher and student-to-student interaction. It is worth noting that, among e-mail, telephone call and social networking site (e.g. Facebook), the students prefer to use e-mails for communication with the teachers, while they prefer telephone calls and Facebook when communicating with classmates. However, the discussion board on the online learning environment, the web-based learning

Table 9.1 Familiarity of mobile devices using iOS

I am familiar with the following mobile devices using iOS	Mean	SD
iPad/iPad mini	5.070	1.820
iPod touch	4.665	1.891
iPhone	4.898	1.812

Table 9.2 Ownership of textbook version

Which version of textbook do you have?	Frequency	Percentage
Printed (i.e. paper) version	32	20.6
Electronic version	63	40.6
Both of the above	32	20.6
None of the above	28	18.1

Table 9.3 Pattern of communication – preferred means to communicate with teachers

Means of communication	Rank (frequency of students)									Median
	1	2	3	4	5	6	7	8	9	Rank
Face-to-face interaction	85	10	11	3	2	0	0	2	5	1
Mobile instant messaging (e.g. WhatsApp, line)	13	30	25	10	16	6	12	2	3	3
E-mail – using computer	8	16	27	17	23	10	8	5	4	4
E-mail – using mobile device	4	15	19	37	12	15	8	6	2	4
Telephone call	2	31	16	10	13	3	14	5	22	4.5
Facebook – using mobile device	2	5	5	14	14	24	15	24	15	6
Facebook – using computer	0	3	9	11	15	16	22	21	20	7
Discussion board on online learning environment – using mobile device	3	3	2	7	10	29	16	33	15	7
Discussion board on online learning environment – using computer	1	5	4	8	14	14	23	18	30	7

Valid responses = 118

management system currently in use for the nursing courses, ranks the lowest for communication with both teachers and classmates.

Psychological Readiness

Figure 9.1 shows the students' preference of mobile device for study. A majority of the students (65%) indicated their preference for iPad mini over iPod touch and other mobile devices (e.g. android devices and notebook computers). This suggests a favourable response to mobile learning using iPad mini.

Table 9.5 reports the students' rating of learning materials to access anytime and anywhere (using a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly

Table 9.4 Pattern of communication – preferred means to communicate with classmates on academic matters

Means of communication	Rank (frequency of students)									Median
	1	2	3	4	5	6	7	8	9	Rank
Face-to-face interaction	81	17	5	6	4	1	0	0	1	1
Mobile instant messaging (e.g. WhatsApp, line)	27	46	31	1	2	1	4	2	3	2
Telephone call	3	32	35	4	18	5	7	1	10	3
Facebook – using mobile device	3	7	20	37	15	9	8	14	4	4
Facebook – using computer	1	4	9	31	32	11	10	7	12	5
E-mail – using mobile device	0	2	4	19	14	41	25	9	3	6
E-mail – using computer	0	2	5	9	18	28	44	5	6	6
Discussion board on online learning environment – using mobile device	0	2	4	2	11	13	9	55	21	8
Discussion board on online learning environment – using computer	0	3	4	8	3	8	11	24	56	8

Valid responses = 117

Fig. 9.1 Preference of mobile device for study

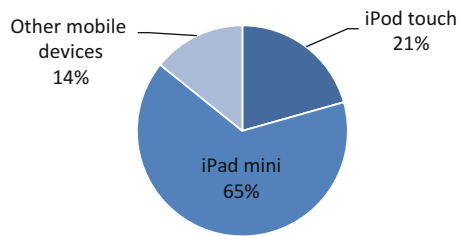


Table 9.5 Learning materials students would like to access anytime and anywhere

Learning materials	Mean	SD
Lecture PowerPoint slides	5.766	1.095
Lecture handouts	5.763	1.187
Textbook	5.101	1.442
Videos from external sources (e.g. YouTube)	4.950	1.281
Supplementary learning materials (e.g. online articles)	4.918	1.321
Nursing videos from OUHK	4.911	1.299

agree)). Lecture PowerPoint slides and handouts are the two most preferred materials to be accessed in a mobile environment, followed by the textbook. This suggests that the students wish to study the lecture contents in mobile environments other than the classroom.

Table 9.6 presents the students’ preferences of functions/materials to be provided in the mobile device (using a ranking scale from 1 (most preferred) to 7 (least preferred)). The students tend to favour the nursing learning materials. It is notable that communication function for class interaction ranks the lowest. The students may

Table 9.6 Students' preferences of functions/materials to be provided in the mobile device

Functions/materials	Rank (frequency of students)							Median
	1	2	3	4	5	6	7	Rank
Multimedia materials of body systems and diseases	37	24	21	18	14	4	5	3
Medical terminology	24	31	16	11	19	15	7	3
Audio examples of auscultation (e.g. heart sounds and breath sounds)	15	19	23	30	24	10	2	4
Procedures of health assessment	28	12	19	18	14	31	1	4
Image examples of ECG patterns	11	20	22	30	32	7	1	4
Audio version of reference articles	8	12	22	12	15	40	14	5
Communication function for class interaction (e.g. discussion board)	0	4	1	5	7	15	89	7

Valid responses = 123

not have a strong need for online class interaction or such need has been largely satisfied by mobile apps in use.

Table 9.7 presents the students' preferred locations to access electronic materials. Most students prefer to use electronic materials at home (54.8%) or places with Wi-Fi network (50.3%). Some of them also wish to access the materials in classrooms (43.3%) or libraries (34.4%). This result supports the need of the students for mobile learning to access learning materials in different environments.

Table 9.8 shows the students' perceived importance of factors determining their use of electronic materials (using a ranking scale from 1 (most preferred) to 9 (least preferred)). Ease of reading and ease of note-taking and highlighting are the two most important factors, followed by ease of searching information, portability, ease of storage and look and feel. It is noted that 'look and feel' has extreme ranks, in which a high proportion of the students perceived it as an important factor while another substantial proportion regarded it as unimportant. Multimedia content, cost and ease of sharing were deemed less important for the use of electronic materials.

Table 9.9 shows the students' perceived importance of factors determining their use of mobile devices for learning (using a ranking scale from 1 (most important) to 6 (least important)). Level of comfort in reading is the most important factor, followed by portability and input and output capabilities. The students paid less attention for the processor speed and 3G/4G networking function of the devices. For the factors that may be contradictory, such as level of comfort in reading (which may refer to a device with a larger screen size) and portability (which implies smaller size and weight of the device), the students prefer the device to be more suitable for reading.

Table 9.7 Students' preferred location to use electronic learning materials

Locations	Frequency	Percentage
Home	86	54.8%
Other places with Wi-Fi network (e.g. restaurant)	79	50.3%
Lecture halls/classrooms	68	43.3%
University's libraries	54	34.4%
Other (self-study room, computer room, street, vehicle)	13	8.3%

Note: Students may choose more than one option

Table 9.8 Students' perceived importance of factors determining their use of electronic learning materials

Factors	Rank (frequency of students)									Median
	1	2	3	4	5	6	7	8	9	Rank
Ease of reading	33	30	26	13	10	4	2	1	0	2
Ease of note-taking and highlighting	34	31	18	19	7	4	2	4	0	2
Ease of searching information	5	12	21	14	18	21	16	8	4	5
Portability	10	11	8	19	18	18	14	18	3	5
Ease of storage	2	10	17	18	20	21	13	10	8	5
Look and feel	23	11	7	14	9	7	4	17	26	5
Multimedia content	0	9	8	9	15	13	19	26	20	7
Cost	8	6	8	6	9	12	17	10	41	7
Ease of sharing	2	2	3	7	15	19	30	24	16	7

Table 9.9 Students' perceived importance of factors determining the use of mobile devices for learning

Factors	Rank (frequency of students)						Median
	1	2	3	4	5	6	Rank
Level of comfort in reading (e.g. screen size)	59	18	19	7	6	11	2
Portability (e.g. size and weight)	32	33	18	17	11	12	3
Input and output capabilities (e.g. efficiency of typing)	16	26	24	18	26	11	3.5
Storage capacity (e.g. memory)	5	18	26	39	16	18	4
Processor speed	4	13	22	19	46	17	5
3G/4G networking	6	12	12	22	17	52	5

Discussion

This survey has shown the preferences of nursing students in mobile learning. It has also revealed how the students are ready to engage in mobile learning.

The students generally possess the knowledge and skills required for mobile learning. They are familiar with the mobile devices and electronic materials of the nursing courses. This implies that most of them can adapt to mobile learning without much effort, when the contents and ways of delivery suit their needs.

For the mobile learning materials, the students indicated their preference to have those summarising the major contents of the nursing courses, i.e. lecture handouts and PowerPoint slides. They also preferred supplementary materials such as multimedia materials of body systems and diseases and medical terminology. On the other hand, the students expressed a diverse range of preferred locations to access the materials, e.g. home, libraries and other places with Wi-Fi network. This suggests their need of mobile learning in terms of accessing the materials anytime and anywhere to facilitate their study of the nursing courses.

The students appear to view mobile means of communication as a less-preferred alternative. Most of them would choose to have face-to-face interaction, if applicable, both for communication with teachers and classmates on academic matters. This is also reflected in their preference of functions/materials to be provided in mobile device – communication function for class interaction is ranked the lowest. This result deviates from the hypothesis of some mobile learning theories. For example, in Koole's (2009) FRAME model, social interaction is one of the core aspects in mobile learning. Further investigation is needed for finding out the reasons of such students' preference.

In general, the choice of iPad mini to be used for mobile learning in nursing education will suit the students' preference, both in terms of their familiarity with the device and their need to have a high level of comfort in reading. Among the different features of the mobile device, mobile networking (3G/4G) was ranked the lowest. This suggests that the students may not have a strong need to access the Internet anytime, or they deemed it acceptable to access the Internet only in locations with Wi-Fi network.

Conclusion

This study contributes to uncover the preferences and readiness of nursing students for mobile learning. The students expressed their desired ways of studying the nursing courses which can be largely satisfied by the features of mobile device and mobile learning materials planned to be provided.

For implementing mobile learning in the nursing courses, the present findings show that the students may only value the learning materials provided and the opportunity to access the materials anywhere. While they did not indicate a strong preference of mobile communication with teachers and classmates, further support may be necessary if part of learning activities are planned to deliver through mobile interaction. This may involve provision of training and technical support for the communication functions of the mobile device or having the learning activities as a compulsory part of the courses. As mentioned in Kenny et al. (2012), increasing students' familiarity and experience in using mobile devices would facilitate their engagement in mobile learning. It is expected that their self-efficacy will be increased if more exposure is provided to the students, which would contribute to raise their attitude to mobile learning.

Looking ahead, students' preference may change after mobile learning has been implemented. Further adjustment in mobile learning provision may be required. We

are also waiting to see the extent of effectiveness when mobile learning has been planned in a way taking into account the students' preference that this study has shown.

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References

- Abas, Z. W., Chng, L. P., & Mansor, N. (2009). A study on learner readiness for mobile learning at Open University Malaysia. In *Proceedings of IADIS international conference mobile learning 2009* (pp. 151–157). Barcelona, Spain.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.
- Baker, A., Dede, C., & Evans, J. (2014). *The 8 essentials for mobile learning success in education*. Qualcomm. Retrieved from <https://www.qualcomm.com/media/documents/files/the-8-essentials-for-mobile-learning-success-in-education.pdf>
- Cheon, J., Sangno, L., Crooks, S. M., & Song, J. (2012). An investigation of mobile learning readiness in higher education based on the theory of planned behavior. *Computers & Education*, 59, 1054–1064.
- Evans, C. (2008). The effectiveness of m-learning in the form of podcast revision lectures in higher education. *Computers & Education*, 50(2), 491–498.
- Hamat, A., Embi, M. A., & Hassan, H. A. (2012). Mobile learning readiness among UKM lecturers. *Procedia-Social and Behavioral Sciences*, 59, 406–410.
- Hussin, S., Manap, M. R., Amir, Z., & Krish, P. (2012). Mobile learning readiness among Malaysian students at higher learning institutes. *Asian Social Science*, 8(12), 276–283.
- Kenny, R. F., Park, C., Van Neste-Kenny, J. M., Burton, P. A., & Meiers, J. (2009). Using mobile learning to enhance the quality of nursing practice education. In M. Ally (Ed.), *Mobile learning: Transforming the delivery of education and training* (pp. 75–98). Athabasca, AB: Athabasca University Press.
- Kenny, R. F., Van Neste-Kenny, J. M., Burton, P. A., Park, C. L., & Qayyum, A. (2012). Using self-efficacy to assess the readiness of nursing educators and students for mobile learning. *The International Review of Research in Open and Distributed Learning*, 13(3), 277–296.
- Koole, M. L. (2009). A model for framing mobile learning. *Mobile Learning: Transforming the Delivery of Education and Training*, 1, 25–47.
- Kukulska-Hulme, A., & Traxler, J. (2005). Mobile teaching and learning. In *Mobile learning – A handbook for educators and trainers* (pp. 25–44). London: Routledge.
- Lee, J. K. L., & Tsang, E. Y. M. (2006). Mobile learning support in patient care and clinical nursing education. In *Proceedings of the international conference on ICT in teaching and learning (ICT 2006)*. Hong Kong, China.
- Parasuraman, A. (2000). Technology readiness index (TRI): A multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, 2(4), 307–320.
- So, W. W. S. (2008). A study on the acceptance of mobile phones for teaching and learning with pre-service teachers in Hong Kong. *Journal of Educational Technology Development and Exchange*, 1(1), 81–92.
- UNESCO. (2012). *Mobile learning and policies: Key issues to consider*. Paris: Author.
- Uzunboylu, H., & Ozdamli, F. (2011). Teacher perception for m-learning: Scale development and teachers' perceptions. *Journal of Computer Assisted Learning*, 27(6), 544–556.