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Abstract

Mobile technology plays an important role in the economic development of a country as well as in teaching and learning. The development of mobile teaching and learning programs includes the efforts from course designers, system designers, software developers, teachers, educators, and students. From the industry point of view, it also needs the efforts from many service providers and content providers to implement a good mobile teaching and learning experience. All of these elements are essential for a good mobile teaching and learning program. The people who either worked in front of the classroom or behind the scenes should be appreciated. This chapter introduces some real cases, experiences, and theories in developing mobile teaching and learning programs in different countries. The technical barriers, difficulties, and solutions are also introduced in the following chapters. These invaluable experience and cases shed light on future mobile teaching and learning system design and development.

It has long been recognized that there is a close link between the sophistication of a country's telecommunications systems and its economic prosperity. Although the origins of telecommunications lie in services provided along fixed, terrestrial linkages, the future of telecommunications is increasingly linked to wireless. Mobile technologies have grown dramatically during the last decade. It changed the styles of learning as well as living. While today mobile devices are still used primarily for voice and text message communication, people increasingly also use them to take and send pictures, listen to music, record video, watch TV, play games, surf the Internet, check email, manage their schedules, browse and create documents, and more. The mobile device market is large and fast growing. Telecom service providers, including the Application Service Provider (ASP), Internet Service Provider (ISP), Managed Service Provider (MSP), and Managed Internet

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Service Provider (MISP), provided various services and applications to their users. Content providers, including designers, developers, and educators, developed good curriculums and contents for learners all over the world. They all worked together to provide the best learning experience for learners. All of these elements are essential for implementing mobile teaching and learning. These people who either worked in front of the classroom or behind the scenes should be appreciated for their contributions to the social and economic development of the world.

The fast growth of mobile telecommunications also brought great opportunities for educators to put their teaching materials online and provide personalized education to learners all over the world. It reduced the geographic location barriers, cultural barriers, religious barriers, and language barriers across nations. But it also brought challenges for educators to learn, understand, and adopt all these advanced and changing technologies in their teaching processes. It is widely accepted that mobile technology has changed human's life in many dimensions. But there is always something left to be enhanced, such as security of information, quality of signals, high costs of mobile devices and connections, and merging of new technology in real life. The convergence of various technologies increases the level of service substitution in the mobile telecommunications market. The development of 3G (third-generation networks) and 4G (next-generation cellular wireless access standards) also brought new opportunities for teaching and learning. However, the different types of mobile devices, different protocols for telecommunication industries, different operation systems on mobile devices, different developing languages and various of versions, different regulations and policies in different countries and institutions, different adoption of mobile devices and mobile technology by learners, different environments in different places, and different skill levels of the designers and educators all limited the developing of mobile teaching and learning programs for general learners. Designers and educators from universities, schools, and industries had put a lot of efforts in solving these problems. It is expected that the future technologies and collaborations will bring solutions to these problems step by step.

To develop a good educational mobile application or program, it is important to understand from the initial needs of mobile learning from the students. It helps to design a good structure for mobile learning in terms of curriculum, teaching materials, and system structure for the mobile educational program. Besides these, the engagement of students, adoption of new products and technology, and the safety of contents should also be taken into account. The curriculum designer should work closely with the application developer to implement the contents into mobile software or program properly. The teachers should be equipped with technology skills and knowledge as well as the good understanding of the functions and design of mobile teaching and learning applications and programs. The interactive design of learners' reflection and further improvement is also important for a good mobile learning program. Therefore, in mobile learning programs, designer, developer, teachers, and learner should work together to enhance the learning experience instead of one-way knowledge transfer. Due to the lack of mobile signals in some places and high cost for mobile data transfer in some countries,

mobile learning anywhere and anytime is not fully achieved yet. Mobile learning programs or applications should also complement the face-to-face learning in current stage as technologies cannot replace the traditional learning experience. All these problems are expected to be solved in the future.

Some real case studies on the developed and implemented educational program as well as some data collected from industry are included in the following chapters. These cases are from variety of disciplines and different countries. Some of the leading-edge technology or products for education are also introduced in this section to predict the future trends of mobile educational application development. Educators and students are benefited from these mobile learning programs. They also shed light on the future design of mobile educational programs for industry partners and educators from universities, business, and institutions.

In ► [Chap. 16, “Novel Education Pattern Applied to Global Crowd of all Ages: Mobile Education,”](#) Fosse Zhang from Tsing Hua University in China proposed a program that adopted a novel education pattern to global crowd of all ages from health disciplines. A mobile education framework was introduced in this chapter, which consists of two components: an offline summarization system and an online system. Mobile education has many advantages. It can be used for pervasive education, flexible education, efficient education, individualized education, and life-long education. But the performance of mobile learning is also influenced by mobile device, usability, functions, and current mobile technologies. The different users, including educators, parents, and students, were also discussed in this chapter. The author believed that mobile education has a great pedagogical potential and has been recognized by educational researchers. It has an ability to exert interest in learning, expand the learning community, and be helpful to develop life-study enthusiasm in social.

In ► [Chap. 17, “Construction Safety Knowledge Sharing via Smart Phone Apps and Technologies,”](#) Dr. Rita Yi Man Li discussed the importance of safety knowledge in mobile educational programs. Construction accident rates are high in many places, leading to high compensation, loss in manpower, and extension of time. Accidents may happen due to complex equipment and tools, outdoor operations and fast changing design, and poor workforce safety behaviors and attitudes on sites. Generation Y (born between 1982 and 1995) is also known as Generation Why, Generation Next, the www generation, the Millennium Generation, or Echo Boomers. They grow up in a media and technological-saturated world, used internet more than watching TV. They used more mobile technologies than any other age groups. They most common type of mobile communication software they use are Line (in Korea), Wechat (in China), and Whatsapps (in Hong Kong). But they also had comparatively shadow experience and knowledge and may easily become victims on sites. This chapter listed the factors that lead to construction accidents for this particular generation. Two construction safety cases from Korea and one case from USA are studied in this chapter. In the end of the chapter, the author suggested that young construction workers should be educated by using the latest mobile technologies in view of the case studies in the USA and Korea and the popularity of mobile technologies. This chapter introduced a negative influence

from mobile knowledge safety issue for special group of learners. It shed light on future design of mobile learning program as well as mobile regulations and policies too.

Dr. Sharon Rees, Dr. Clint Moloney and Dr. Helen Farley showed how mobile technologies facilitates teaching and learning in a very traditional learnt by seeing and doing nursing education in ► [Chap. 18, “Mobile Learning Initiatives in Nursing Education.”](#) Mobile learning has changed nursing education, providing learning to nurses when and where they need it and in a manner that achieved positive learning outcomes. The authors argued that mobile learning through YouTube and augmented reality offer the best of the traditional way of learning combined with time and cost efficient means of technology use and greater theoretical knowledge. SMS and online learning also helped reaching nurses in rural and isolated communities. Nurses can learn at a time and place suitable for them. Many isolated trials have occurred in nursing education over the years with the use of PDAs. This chapter adopted a grounded theory approach and investigated nurse’s current use of mobile technology and their beliefs around mobile learning. The chapter also explored how and when nurses are undertaking continuing education, with the discovery of how they personally resource their learning. The authors also indicated that organizations should taking into account the obstacles and privacy issues when adopting mobile learning in workplace. Combined mobile technology with social media in mobile learning for health education was also discussed in the chapter. The authors indicated that artificial intelligence (AI) agents will play an important role in future mobile teaching and learning. Although there are still many concerns of adopting mobile devices and technologies for health education, such as privacy issues, costs of learning, and using mobile devices in clinic areas, the authors believe that mobile learning will start to be used more for education within nursing. Some interactive applications not only assist learners from health discipline but also help spread the knowledge to public learners and individuals who are interested in this area.

In ► [Chap. 20, “Uniqueness in Mobile Teaching Environment Design Methodology,”](#) Dr. Chih-Hung Li, Zinian Li, and Yi Lu from Nan Tien Institute introduced the use of mobile technology in teaching and learning in a totally new area – for religions teaching and learning. As the designers for the first higher education institution in Australia for Buddhist education, the authors adopted the most up-to-date technology and way of teaching for students to learn as they need. The teaching method was combined with face-to-face delivery and interactive communication through all sorts of multi-media networks. The authors were also encountering some difficulties during developing and implementing processes, including the users’ resistance, inaccurate cost forecasting, inability to foresee the risks, etc. The problems are very common in all mobile development (or software development) projects. Therefore, the authors proposed a framework from theoretical bases to solve these problems. This chapter discussed the framework from six different aspects: institution development scope, business objectives, course content cost, teaching resources, targeted student, and institution’s technology acceptance level. The authors also gave some useful suggestions for designers and developers for future mobile learning programs. This chapter broadens the use of

mobile technology in different places and institutions. Mobile technologies can across geographic location, cultural barriers, religion barriers, and political barriers and benefit all the learners from anywhere.

In ► **Chap. 19, “Tutors in Pockets for Economics,”** Dr. Aimee Zhang and Jun Hu introduced the mobile learning project for Economics discipline and the design of extended mobile learning framework for all other contents in the future. This chapter also introduced the design, development, implementation, and evaluation processes of this project. Tutors in Pockets (TIPs) is designed as an assisting teaching and learning tool for economic subjects with a flexible framework. It suits any smart mobile device that supported multimedia materials, such as video, audio, picture, web-link, and text. To implement a better “anywhere” and “anytime” mobile learning system, both online and offline functions are important in the structural design. A picture is worth a thousand words, while an animation is worth millions of words. “Simplify knowledge” was the key idea for the content development in this project. All the threshold concepts are developed into animated cartoons or cartoons in real case studies to increase the interests of learning and reduce the barriers for first year students in the university. These materials were designed for mobile devices in smaller size and less text words (for smaller screens and less reading time on mobile devices). To provide an equal access to students using other mobile devices (not IOS or Android mobile platforms) and students without a mobile device, the teaching materials are also used in lectures and tutorials. Student feedback was collected through both face-to-face interviews and online surveys. The results showed that this project had a positive influence on students’ learning efficiency, understanding of complex conceptions, long-term memories, correcting of some misconceptions, engaging in discussion with other students and teachers, and performances in subjects. Both students and educators had agreed that they are benefited from this project. Different mobile learning projects and programs may be developed by different computer languages and established on different operation systems or mobile operation systems, but all of them performed as a knowledge transfer channel to help students and learners understand better the concepts and course contents as well as facilitated teachers and educators with better or more convenient ways in their teaching and communicating with students. Technology is a tool for teaching and learning. It should assist teaching and learning just like normal chalks and blackboards. A good mobile teaching and learning system should be based on solid knowledge base, proper curriculum design and system design, good understanding of the students’ needs, prompt communication between students and teachers, and continuous enhancements and improvement due to proper suggestions and feedbacks. No technology can perform as a good teaching and learning platform without these important elements.