

# The Status Quo and Perspectives of Mobile Learning in Taiwan

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**Abstract-** In this study, the sequence and trends of mobile learning in Taiwan region from the three aspects of background and content, development, and future perspectives was firstly analyzed. Then, the definition, elements, and characteristics of mobile learning were explored from its background and contents. The last section of this study depicted the current condition of mobile learning in Taiwan region through aspects of civil mobile learning, shorten of digital divide, e-books, establishment of the e-Learning Network Science Park (e-park), policy making and manpower cultivation, technology development of mobile learning, establishment of mobile learning environment and network learning center. The future perspectives of mobile learning in Taiwan including academic-industry cooperation, enhance value added through technology, merge teaching strategies of mobile learning into practice, provide accurate mobile learning programs, integrate life-long mobile learning network, and build mobile learning network community.

*Key word:* Mobile Learning, Taiwan Region, Digital Learning

## 1. Introduction

Due to the rapid change and development of technology industry, the traditional industry and techniques are facing a big challenge. Living and learning styles tend to become more technology because of the update technology and the development of network. In the knowledge economy era, the acquirement and application of knowledge

and information will no longer be limited in books but the technology and equipments. For example, the ministry of education of Taiwan has been promoting several activities in order to achieve the philosophy of everywhere can learn, everyone can learn, such as “merging information technology into teaching” in K-9 curriculum, emphasizing teachers should combine information technology into teaching

activities, establishment of a wireless network campus and public places.

Mobile learning has attracted more attention. Many studies also showed that the learning tools have been widely applied in many fields from the public, including agriculture, tourism, business, and medicine [1][2][3]. Mobile learning refers to conduct an online learning or offline learning through learning tools without the limits of time and locations. It also means a wide range of learning activities from the data collection, data reading, to data writing. Thus, mobile learning has become a civil learning activity. Mobile learning has become a learning trend due to the progress and development of information technology, communication technology and network. In the near future, the promotion of the mobile learning will not only focused on the utilization of mobile technology but how to effectively apply learning theories to learning strategies, and the development of appropriate teaching materials. As a result, Taiwan will have the chance become the number one in the world of building mobile learning.

## **2. Background and contents of mobile learning in Taiwan region**

Mobile learning has become a new learning trend for obtaining new information and knowledge through internet due to the progress and development of information technology, communication technology and network. Due to the mobile learning has been paid more attention lately, the background and content of mobile learning are necessary to be explored and discussed. The definition, elements, and characteristics of mobile learning are discussed as follows.

### **2.1 The definition of mobile learning**

The concept of action learning was originally proposed by the British scholar of management. In fact, the concept of mobile learning involves with the concepts of learning by doing and experiential learning. Its essence is also similar to Chinese scholar, Wang Young-ming's idea of mixture of knowing and doing. Su, Peng, and Chou mention that the definition of mobile learning can be grouped into three categories. The first category of mobile learning focuses on the application of mobile devices and wireless network. The second category focuses on action. The third category emphasizes that the great accessibility of connection and communication such as multiple connection devices for building an accessible mobile learning environment [4]. Thus, mobile learning emphasizes on the mobile learning environment but the learning from action. That is,

learners can bring personal learning information and materials to learn at any place and location. Mobile learning is built on the basis of distance learning and digital learning. Basically, the practice of mobile learning is rooted in the mobile and network technology and through mobile device to put the learning into practice. Therefore, portability, wireless, and mobility have become the features of mobile learning.

Su and Lin mentioned that the content of mobile learning includes the following features. First, mobile learning is built on the basis of digital learning. Second, mobile learning is the combination of digital learning and mobile technology. Third, learners can learn at any time and any places. Fourth, mobile learning can provide appropriate teaching content and establish personalized learning environment based on learner's location or situation. Fifth, the mobile devices are portable and easy to carry [5]. According to the conditions of network, mobile learning can be classified into two types of application.

#### **(1). Off-Line M-Learning**

Off-line mobile learning is to download learning materials to mobile devices. Learners can learn without online connection. For instance, learners can read information through PDA or computer while waiting a bus, taking MRT, or waiting in the airport. In this process, learners' learning record will be recorded in the devices. When learners log on the internet, learners can continue to learn and the learning records will be combined.

#### **(2). On-Line M-Learning**

On-line M-learning is perfectly matched with the characteristics of portability, wireless, and mobility. Learning happens under the wireless internet environment. For example, learners can log on the mobile phone or laptop computer or PDA to search related information and resources while visiting a natural botanic park. Learners' learning record can also be recorded in the mobile devices. Accordingly, school administrators should begin their mobile learning. The strategies include changing modes of saneness, reconciling organizational barriers, collecting various opinions, building common future vision, and utilizing organization and meetings and to form an action team to learn.

### **2.2 The elements of mobile learning**

The elements of mobile learning adopted in Taiwan can be included as following:

#### **(1). Wireless network and mobile devices**

Seppala & Alamaki defined the features of mobile devices including mobile, wireless, and handheld [6]. In addition, Sharples argued that software, hardware, and interface should be taken into consideration while designing a personal mobile learning technology [7]. The hardware of mobile devices can be classified into six categories, including wrist-worn devices, mobile phone, handheld computers, PAD, laptop computers, pen tablet computers. Fischer mentioned that the needs of the end-user should be taken into consideration while evaluating software. In addition, Fischer argued that the end-user should be able to modify the evaluation on software. Thus, the design trend of software has been shifted from reusable to a collaborative knowledge construction [8].

### **(2). Mobile learner**

The second fundamental element of mobile learning is the mobile learner. Hardless argued that mobile people will be proceed locally mobile, for saving time for learning, or traveling to work [9].

### **(3). Theories of mobile learning**

The mobile learning based on teaching theory and school needs has been neglected in the past. Thus, the researchers present “knowledge construction is everywhere” as the theoretical foundation for m-learning. The concept of knowledge construction is everywhere” contains two major meanings. One is the mobile learning based on the constructivism; the other is lifelong learning as the guideline of mobile learning. Recently, a number of mobile learning systems have been developed. For instance, a user can browse teaching materials through mobile devices as well as link users to form a network to learn and interact with others. Also, a learning environment with a set of software and hardware can be built in a classroom. In addition, there are some specific learning facilities have been developed to support the mobile learning. As a result, mobile learning has become a main stream of new digital learning [10]. To sum up, the elements of mobile learning consist of a mobile learner, mobile learning devices, and mobile learning environment. These three elements are tightly connected with each other.

## **2.3 The characteristics of mobile learning**

Su found that mobile learning is no longer limited in school classrooms. It also brings some impact and change to learning. When the mobile learning is being promoted, its characteristics should be soundly utilized and mastered [3]. The characteristics of mobile learning include:

### **(1) Activeness**

Learners are the main body of learning activities. Learners should actively seek and obtain knowledge and to be individual thinkers and problem solvers.

### **(2) Mobility**

Learning can be initiated in any places, such as on the MRT, on a train, in an exhibition, at a rescue site, in the botanic park, museum, science museum, marine and aquarium museum, a planetarium, or the outdoor.

### **(3) Readiness**

Sometimes the acquisition of knowledge can be immediate in order to solve the issues or problems.

### **(4) Interactivity**

Learners can either synchronously or asynchronously use texts, voice, pictures, animations, or video-conferencing to interact with teachers, expert, or peers through multimedia interfaces. .

### **(5) Entirety**

Wireless network can integrate many sources of information to be provided to learners to a conduct multiple, holistic, and omni bearing learning.

To sum up, the characteristics of mobile learning must include the activeness, mobility, readiness, interactivity, and entirety.

## **3. The status quo of mobile learning development in Taiwan**

### **(1) A civil mobile learning**

Due to the invention and evolution of PDA in the recent years, PDA has not only been used as notebook or calendar but also can be used to receive and send emails, browse websites, and conduct work processing works. In addition, PDA can be applied to business or school's information reform, such as recording and managing students' attendances. Furthermore, PDA can be used in PE instruction with applications of multimedia instruction, the creation of multimedia teaching films, and student's learning management system to enhance teaching effectiveness and quality in order to enable the development of physical education merged with high tech [11]. Moreover, Chao pointed out that the characteristics of applying PDA to technology education include its affordable price, easy to carry around, broader applicability, and providing students to learn actively [12]. In sum, the application of PDA is widely broad. The results indicated that the immediateness and convenience of PDA have promoted work effectiveness as well as the technology literacy. Nowadays, mobile learning is not limited in library, school but every corner of the whole world. For instance, in the airport, subway station, MRT station, fast food restaurants, even outdoors. Like in some counties of Taiwan, residents

only need to get an account number and password to log online to learn online or offline. Mobile learning does not only designed for students, teachers, administrators and CEOs, it has been spread to the whole community and society. The public should learn at any time and anyplace to enhance their competitiveness. Recently there have been a number of studies concerning mobile learning and its application has been quite broad. For instance, the establishment of learning platform in the multimedia center [13], the applying personal digital assistant to the touring calligraphy and books [14], the analysis and application of English mobile learning model [15], and the integration of intelligent PDA to the action research of nature and life science technology in middle schools [16]. Due to the prosperous development of technology in Taiwan, many well-known technology firms have founded branches or factories in Taiwan. Mobile learning does not influence technology but also bring impact on our education. The evolution of mobile learning in Taiwan has become the learning for entire people and lifelong learning in Taiwan.

### **(2) Shorten the gap between urban and rural areas**

The Ministry of Education, Taiwan has paid more attention and subsidized information education in every cities and counties. Thus, many cities and counties have founded the digital learning center for the purpose of subsidizing and training disabled students and minority groups to improve their ability of information application. As a result, many cities and counties are holding the qualification examinations on teacher's information ability in order to improve teachers' information ability and information literacy. Meanwhile, schools also integrate information education with software and hardware equipment to provide a variety of online teaching materials to teachers and students. Furthermore, government also encourages colleges and community groups to rural areas to develop information education in order to shorten the gap between urban and rural areas.

### **(3) Mobile devices and auxiliary devices: multifunctional electric schoolbag**

In the past, Taiwanese students had to carry quiet a few of textbooks to school, including textbooks, exercise books, or reference books due to the various subjects. This may cause a students need to carry a very heavy schoolbag to school and become the student's burden. As a result, R & D people invented mobile devices or auxiliary devices such as the electrical schoolbag or table PC for students.

Students only need to use these devices to learn at school instead of the traditional heavy schoolbags. Some researchers even conducted related studies of the replacing the traditional communication book with electrical communication book [17]. The results indicated that the users of mobile devices are not only students and teachers but also the parents. Thus, mobile learning has gradually become the entire people learning.

### **(4) The establishment of digital learning network science park**

In 1979, Taiwan authority has paid attention to digital learning and established a digital learning network science park. The purpose of establishing this science park is to combine industry, government, academia, and research to provide industry knowledge service and cultivate digital industry to become a leading position in the world, and to provide industry digital learning and mobile learning action projects, develop e-learning development platform for industry. Due to the rapid changing of information industry, mobile learning has replaced digital learning and become the world trend. Mobile learning is built on the basis of digital learning with the combination of mobile technology and digital learning to enable learners to learn any time and anywhere through mobile devices and wireless network to obtain learning content or communicate with peers and teachers.

### **(5) Policy directing and talents cultivating**

Up-to-date, there are about 60 colleges and universities offer e-learning courses with over 1500 courses and over 175000 people attended these courses. In addition, there are 10 networks learning related departments have been established in colleges and universities in Taiwan and 57 schools have built distance learning related websites. These results indicated that Taiwan authority has paid emphasis on information education. Currently, every qualified school teachers have to pass the information ability exam prior to become a qualified school teacher in some cities and counties. As a result, the information talents cultivation has been emphasized and scholarships are also provided to outstanding students as well as to recruit those outstanding students to work in their R & D department.

Mobile learning is not only import for talents cultivation but also the direction of policy. For instance, The Taiwan government has taken information education as a part of compulsory education. Many of seminars, conferences, workshops of information education have been held for improving the public or teachers' information literacy.

#### **(6) The research and development (R & D) of mobile learning techniques**

There are a verity of mobile learning devices available and the tools can be vary depending on users and venues, such as small and simple PDA and intelligent PDA. A good PDA should possess the characteristics of light weight, small size, high efficiency, stable system, abundant auxiliary tools, easy to sue, more applications, save energy, and be able to be compatible with computer and wireless communication. The intelligent PDA has voice and digital communication functions. Especially, PDA with mobile phone function can be used as notebook, telephone book, calendar, photo taking and recording. In addition, intelligent PDA with Office mobile software can also process word documents and download word, excel, and power point. But the intelligent PDA was too expensive to be come popular. The functions of Web Pad are not sufficient to meet the demands of learners. Thus, it has not been very popular. In contrast, the notebook computers are too heavy for learners. Although information technology has been developed rapidly with a variety of products and furious market competition, the future of technology should focus on the research and development of mobile learning to invent a humanized, light weight, wide screen, low price, and expandable learning device for learners. Speaking of the construction of mobile learning platform, experts with education and professional background are encouraged to provide information of nature scenic spots, food, travel, and accommodation as well as to systematically classify the information for achieving the idea of learning is everywhere and everyone can learn.

#### **(7) The establishment of wireless learning environment**

Due to the rapidly development of technology industry in Taiwan, mobile learning has been broadly discussed and changed dramatically. The modes of mobile learning such as Handbook, phone teaching, and memory card have been merged with new technology such as electrical publication, MP3 walkman, World Wide Web (WWW), mobile phone, PDA and table computer. As a result, mobile learning in Taiwan has facing a new challenge. Although there are still some limitations of mobile learning such as cost, size, weight, design of broadband, size of memory, etc., Taiwan government still promotes the establishment of wireless network environment. As a result, wireless learning is no longer being limited by location and time and the evolution of new technology has brought mobile learners more benefits and convenience.

#### **(8) The establishment of network learning center**

Course design and teaching resources can be adjusted to found a network learning center. In addition, the staff of the center should utilize the wireless broadband and mobile communication to enhance the center. Furthermore, teachers can adjust learning resources to arrange and match students' learning needs.

### **4. The future perspectives of mobile learning in Taiwan**

The application and implementation of mobile learning in Taiwan need to be thoroughly considered and organized in order to meet the challenges and create beneficial environment to increase Taiwan's competitiveness. The suggestions for the future efforts in mobile learning in Taiwan are listed as follows.

#### **(1) To strengthen the cooperation between industry and academia**

Currently the industry, academia and officials have come to the same tendency toward the application and analysis of mobile learning. The future R & D experts should integrate the research outcomes to improve system function to invent a suitable learning device or auxiliary device for all. The mechanism of the cooperation between industry and academia has been applied to all kinds of fields, such as beauty and cosmetics, and machine maintenance. Thus, a suitable learning device or auxiliary device should be carefully tested before becoming available in the market. To become available in the market, the cooperation between industry and academia is being extremely important.

#### **(2) To enhancing added value with technology**

Product invention should be able to enhance their R & D techniques in order to create new and high added value products. Recently, businessmen of Taiwan have increased dramatically and their needs of mobile learning also have become demanding. In addition to popularize the application of mobile learning to the public, the techniques of mobile learning devices and its auxiliary devices also need to be enhanced and improved. To invent a new and integrated product is fundamental for the promotion of mobile learning. Also, the expansion of products, price, and the application programs may also influence learners' buying desire. As a result, system R & D personnel should be able to invent convenient, practical, and unique product for mobile learners in

order to face renovation of mobile learning devices and its auxiliary devices.

**(3) To merge with teaching strategies of mobile learning**

The application of mobile learning devices in Taiwan mainly is directed by the learning technology projects. The first part of future classroom learning project combines notebook computers, PDA, cell phones, or table computers to build a new learning environment. That is wireless learning environment. Based on the modes of learning, which are different from the traditional learning modes can be used to extend learning and promote learning effectiveness. The PDA can be provided to 5th graders to browse school botanic website to look up unknown botanic names after observing the characteristics of plants. PDA plays a role of reference with feedback and brings students a convenient and fast learning mode. From the interview records of students, PDA is a new and unique technology product. Students showed positive comments on using PDA to assist outdoor botanic study [18]. As a result, student's learning motivation has been enhanced due to the characteristics of light weights, small size, and easy to carry. Li indicated that students used PDA and mobile phone with photo-taking function as a learning device in the Moo-Tza Zoo in Taipei. During the teaching activity, students' PDA could receive the teacher's message on the mission of looking for animals. Students could locate animals through PDA and look up the related information of animals as well as took pictures of the animals and sent back to the teacher via emails [19]. So, mobile learning devices or its auxiliary devices should be applied in teaching and learning activities. In doing so, students would be interested in learning and thus to enhance learning effectiveness.

**(4) To present accurate and appropriate mobile learning programs**

The government officials should not only promote mobile learning programs but also should present more important and urgent programs of mobile learning. To achieve this purpose, related projects can be assigned to scholars or experts in order to present beneficial mobile learning programs to the public. A good mobile learning program should not be limited to time and venue and should be conduct either online or offline. Also the use of mobile learning devices or its auxiliary devices can vary based on the users.

**(5) To integrate mobile learning network to built mobile learning network community**

The government official should integrate mobile learning network and its resources. Also the gap between the city and the rural should be taken into consideration to build a mobile learning network community.

**5. Conclusions**

The development and upgrade of computer, communication technology, and wireless network, the trend of learning changed from distance learning to digital learning, and finally onto mobile learning. Thus, mobile learning has become a new milestone of learning. The researchers have reviewed the status quo of mobile learning in Taiwan and its future development. The development of mobile learning in Taiwan has been noticed by many countries and the future of mobile learning should focus on the cooperation of industry and academia, apply technology to enhance added value, merge with its teaching strategies, present accurate mobile learning programs and integrate its learning network, and build mobile learning network community to create a new opportunity for the mobile learning in Taiwan.

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