The Outlook of Museum Digital Learning: An Example of the Project of e-Learning at the National Palace Museum

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Abstract: In recent years, many museums have begun the work of digitizing and its collections as well as the promotion of appreciating fine cultural artifacts by the general public. The National Palace Museum, Taipei has a large amount of the collections spanning over 7,000 years of Chinese history, which includes 650,000 objects. In order to allow the public to learn easily the related knowledge of the collections in the Nation Palace Museum. Since 2003, the Museum began the 5-year project of "e-Learning". A number of educational multimedia and learning systems have been developed. This paper would like to describe the recent work of the project and several practical educational activities.

Key-Words: e-Learning, Museum, National Palace Museum

1 Introduction

The National Palace Museum (hereafter referred to as the NPM) has a large amount of the collections spanning over 7,000 years of Chinese history, which includes 650,000 objects composed of ceramics, bronzes, jades, calligraphy, painting, and so on. In recent years, the Museum has begun the work of digitizing and its collections as well as the promotion of appreciating fine cultural artifacts by the general public.

In order to allow the public to learn easily the related knowledge of the collections in the Nation Palace Museum. Since 2003, the Museum began the 5-year project of "e-Learning" sponsored by the National Science Council, which used information technologies to develop the novel learning methods and resources. A number of educational multimedia and learning systems have been developed, such as "on-line learning", "mobile learning", "interactive learning", etc.

The following sections would like to describe the recent work of the project and several practical educational activities.

2 Project Introduction

To complement the promotion of the "National Science and Technology Program for e-Learning", the NPM has been planning and implementing the "National Palace Museum e-Learning" medium-term project from 2003 and will continue to 2007. Using the plentiful cultural resources of the artifacts in the collection of the NPM and with the newest multimedia information and networking technologies, various digital learning resources and services are being developed to provide a superior digital learning environment. The NPM will also establish a museum digital learning demonstration model for promoting the development of related research and industries.

3 Strategy Implementation and the Current Situation

The strategy involves the application of such varied resources as digital courses, tours, and displays, along with innovative developments in online, mobile, and interactive education as ways for learning about the artworks. The following is a description of these three types of strategy and a representation of the current state of implementation and their results.

3.1 Digital Courses and Online Learning

3.1.1 Establishing a Digital Learning Network on the Artworks

The establishment of a digital learning website for NPM artifacts, which is run under the official name "NPM e-Learning" (http://elearning.npm.gov.tw), offers registered learners multiple Internet-based educational services (see Figure 1). Courses and activity news are posted at irregular intervals, and learners can participate in selected course readings,

do post-course evaluation, discuss via exchange and interaction, and keep up with course announcements (see Figure 2). The system can also record previous learning experiences of users for the benefit of post-results evaluation and analysis of the program.

3.1.2 Developing e-Learning Classes

Focusing on the types of artworks that are most popular among and interesting to general audiences, courses over the years have been developed on such themes as bronzes and ceramics (for details, see Table 1).

These include a total of more than 35 thematic classes in both Chinese and English, and they are continuing to be produced. In planning the contents, consideration is given to learners of different backgrounds and ages when selecting materials and designing the contents to make them clear and easy to understand, all done using rich multimedia methods to increase interest in learning(see Figure 3). Teaching methods are based on the design of a teaching strategy involving a spiral repeated method of training. At the same time, it also provides a means for self-evaluation, improving the effectiveness of online self-study by users.

Using the e-learning course series on bronzes entitled "A Marvelous Journey Through Bronzes" (including twelve classes) as an example, the length of each class is about 30 minutes long (see Figure 4). The contents are planned to become increasingly difficult, and they include the establishment of background knowledge in "course summary", introductory fundamentals in "trip of impressions", more advanced learning in "in-depth tour", and also providing a more research-oriented "exploration of discovery".

Fig. 2 The layout of the learning management system

Fig. 3 The presentation of rich multimedia

Fig. 4 "e-Learning on Bronzes" class

Fig. 1 The Portal of the "NPM e-Learning"

The NPM On-Line Courses and theLearning Units included
A Marvelous Journey Through Bronzes (in Chinese, English):
■ The Marvelous Journey of Bronzes: Course Summary
■ Not Everyone Can Do This: Types and Functions of the Bronze Vessels
■ The Pursuit of Beauty: The Forms and Decor of Ancient Bronze
■ The Story of Writings in Bronze: Unlocking the Secrets of Bronze Inscriptions
■ An Alternative to the Platinum Card: Exquisitely Crafted Shang Bronzes
■ Enduring Emblems: The Family Crests of the Ya-ch'ou Clan
■ History Cast in Bronze: The Inscriptions of the Mao-kung Ting, the San P'an, and the Tsung Chou Bell
■ More Than Just a Pretty Picture: The Evolution and Significance of Bronze Decoration
■ Music from the Ancients: The Story of the Bronze Bell
■ The Advanced Bronze Casting Techniques of the Ancients
■ The Conservation and Restoration of Bronzes
■ The Collection and Study of Ancient Bronzes
Exploring Chinese Ceramics with Dr. Dragon
■ New Experiences in Ceramics
■ Points, Lines, and Surfaces of Ceramics
■ A Leisurely Trip Through Ceramics
■ Exploring Chinese Ceramics with Dr. Dragon (in English)
Cracking China: Porcelain Manufacturing in the 18th Century
■ A Phoenix Rising from the Ashes: How are Porcelains Fired?
■ Father d'Entrecolles Record of Experiences at Ching-te-chen: The Techniques and Decoration of Porcelains
■ Mr. T'ang's Second Choice: The Conservation and Restoration of Porcelains
■ Cracking China: Porcelain Manufacturing in the 18th Century (in English)
Caring for Collectible Objects
■ The West Wing's Secrets: A Non-standard Store Room
■ The Treasures' Second Home: A Non-standard Display Space
■ A Good Resting Place: Proper Storage and Display Spaces, and the Restoration Room
■ Caring for Collectible Objects (in English)

Table 1. The List of the NPM On-Line Courses

3.2 Digital Guide and Mobile Learning

3.2.1 Developing a Digital Tour System

In order to provide museum visitors with completely new personalized digital tour services and based on rapid developments in many fields of information technology and communications, such as hand-held computer devices and wireless networking, the NPM is creating "digital tour services" that visitors can individually access. Using appreciation of the artifacts as the setting for learning contents, they are presented in a variety of ways that can be selected, including text, pictures, and audio. The integrated design includes the use of hand-held electronics (such as pocket PCs), wireless earphones, label sensors, and straps.

Based on the learning habits of visitors, the system offers designs for two main tour learning scenarios. The first allows visitors to follow a specially planned "route" form of tour learning, providing a choice of exhibit routes for their trip to the NPM, such as a "30-minute focus tour", "60-minute selected tour", and a "120-minute full tour". The computer will suggest the tour route depending on the artworks that wish to be appreciated. In addition, visitors can also use a "sensor" form of tour learning, in which hand-held electronic devices can receive wireless radio frequency identification (RFID) from the display cases, allowing visitors to receive information for appreciating the display works. Furthermore, based on the principle of adaptive designing, both of the methods mentioned above can be used to provide personalized digital tour learning modes (see Figure 3).

3.2.2 Modes of "Mobile Learning"

Learners can also use such portable devices as a notebook or tablet computer in the galleries to use wireless networking and connect to a special "mobile learning" portal, thereby utilizing an interface to retrieve tour information on the artifacts. At the same time, it can also provide exhibit information and such online digital learning resources as online courses. Not only does such a website present even more complete, varied, and highly interactive forms of multimedia displays, it can also be used to complement and integrate with other present digital learning systems and content (see Figure 5).

Using the case of NPM cooperation with the Taipei City Department of Education in 2005 in the "Wireless Taipei, Unlimited Learning" as an example, the wireless network systems established

on the campuses of primary and middle schools by the Taipei City Department of Education were utilized and combined with the system and contents of NPM digital courses and digital tours, creating and putting into practice a model for "mobile learning" between the NPM and primary and middle schools. This teaching plan of "museum-school cooperation" requires the implementation of three stages. The first is "before the visit," in which instructors compose their teaching materials for students to access wirelessly in class. The second is "during the visit", in which the digital tour/class takes place (see Figure 6). The third is "after the visit", in which students access the Internet for extended post-class learning to complete the process.

Fig. 5 Personalized digital Guide

Fig. 6 Wireless access in the exhibition hall

3.3   Digital Displays and Interactive Learning

In order to create a museum learning environment, the NPM is utilizing the latest forms of information and multimedia technology to develop interactive forms of digital learning display systems. Not only does the NPM provide an innovative and personalized mode of museum digital learning, it is also increasing learners' awareness of and interest in the artworks. By using interactive learning methods, it is reducing the amount of time necessary to learn about and appreciate the artworks.

The "screen-type interactive display" (see Figure 7), for example, involves the round fan format that was commonly used in the Sung dynasty. Participants hold the imitation Sung style fan and gently tap the fluttering butterflies on the standing screen to proceed with the interactive learning on the artworks, and as such can take a tour of and appreciate masterpieces of painting and calligraphy in the NPM collection.

In addition, the "desktop-type interactive display" employs a multiple-user, question-and-answer format to create a setting like that of an elegant gathering of scholars at a desktop to appreciate scrolls of painting and calligraphy. Participants can use their hands to touch the desktop to answer questions related to the artworks (see Figure 8).

Fig. 7 Screen-type interactive display

Fig. 8 Desktop-type interactive display

4 Successful Case Examples

Based on the ideal of a "Digital Museum in Action", the NPM has actively held theme exhibits on "digital learning at the NPM" and related events outside of the museum since 2005. Inspired by the imagery of "a butterfly fluttering in the wind" calligraphed by Emperor Hui-tsung in his "Poetry" of the Sung dynasty, an exhibit entitled "A Butterfly in the Evening Breeze: The Imperial Gardens of Emperor Hui-tsung" has been created (see Figure 9, 10, 11, 12, 13).

An action plan, called "Digital Learning in the NPM", aims to integrate the rich and varied digital learning resources at the NPM. Since being exhibited at the Chiang Kai-shek Memorial Hall in Taipei (from January to March of 2005), it went on tour across Taiwan at such venues as the Taichung County Seaport Art Center (April to June of 2005), National Center for Traditional Art in Ilan (July to September of 2005), National Museum of Prehistory in Taitung (October to November of 2005), and Kaohsiung Museum of History (December of 2005 to February of 2006). From March to June of 2006, it entered a school campus for the first time, being held at National Chiao Tung University in Hsinchu. The total number of visitors has exceeded 230,000, the exhibit meeting with universal praise.

Fig. 9 The itinerant exhibit

Fig. 10 "The Imperial Gardens of the Emperor"

Fig. 11 The learning tour of "tapping the butterflies"

Fig. 12 "question-and-answer" learning

Fig. 13 Interactive multimedia displays

5 Conclusion

To sum up, this paper describes the recent work of the project of "e-Learning" at the NPM, and introduces several practical learning activities. A number of educational multimedia and systems have been developed, such as digital courses, "digital guide systems, and interactive display systems, which can support different learning methods of "on-line learning", "mobile learning", "interactive learning", etc. The itinerant exhibit demonstrates the successes of integrations of digital learning resources.