

VII. LEARNING

A MUSEUM EXHIBITS SUPPORT SYSTEM BASED ON HISTORY AND CULTURE LITERACY

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Abstract *Museums need an interactive data collection and visualisation tool for their artefacts. This paper describes a study in which we enable access to Chinese and Japanese cultural heritage information from two history museums, the National Palace Museum in Taiwan and the Tokugawa Art Museum in Japan. Results from these museum databases were used to develop a prototype system to demonstrate advanced cultural learning and historical timeline functionalities for foreigners. This system is based on temporal data from the museums' databases, and provided the user with powerful data manipulation and graphical visualisation tools. It might become a basis of an interactive digital museum system for Chinese and Japanese heritages especially for foreign users.*

Keywords: Museum, Heritage, Timeline, Exhibits Support System, User Interface

INTRODUCTION

Museums around the world often rely on the internet to enable access to digitised versions of their collections; curators are required to classify and interpret elements of distinct artefacts to prove them for visitors examining and appreciating the works. This has become the normal. Similarly to digital library access, many institutions provide users with both text searching of collection content and categories, such as object type or subject matter, it is really useful

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in organising items for the museum. However, these broad institutions may not always allow the individual to find other's museum collections quickly and easily. There are no systems to integrate other museum collections by different areas, nor even by different countries. The difficulties of changing such a system, it will make it increasingly possible to search and browse for different museum items, using richer sets of heritage classifications which based on the collections database. Nonetheless, we attempt to assist the visitor's understanding of the whole exhibition, this system changes the traditional orientation towards the curator's interpretation and suggests the exhibition introduction in advance especially for first-time visitors. We targeted these visitors who are difficult to interpret their own history knowledge without any support from the curator or professional instructors especially for foreign visitors.

We aim to propose a strategy which mainly increases the understanding of China and Japan's histories by this self-reliant exhibit learning system. This study used two museums data (National Palace Museum in Taiwan and Tokugawa Art Museum in Japan) as our sample. To express how museum web systems could be applied to enhance access to a large online heritage collection from different museums, regards to browsing and exploring the heritage material related to the history timeline.

MUSEUM EXHIBIT INTRODUCTION SITES

2.1 The Exhibit Web Page of the National Palace Museum and the Tokugawa Art Museum

The National Palace Museum is an art museum in Taipei, Taiwan. It is the national museum of the Republic of China, and has a permanent collection of over 677,687 pieces of ancient Chinese artefacts and artworks, making it one of the largest in the world. The collection encompasses over 8,000 years of Chinese history from the Neolithic age to the late Qing Dynasty. Most of the collections are high quality pieces collected by China's ancient emperors. In 2009, it was the 11th most visited art museum in the world.¹ In the Tokugawa Art Museum some idea of the quality of the collection can be gleaned from the fact that besides this early masterpiece the collection includes nine other designated national treasures. Fifty-seven registered important cultural properties, and forty-six important art objects. The museum is noted further for the overall fine condition of its pieces. Moreover most objects have been handed down accompanied by meticulous family documents, catalogues and other records.² However, in these museums and we see Figure 1, despite the situation only one museum data of providing access to cultural heritage material the applications of browsing websites described here have primarily been adopted on experimental sites or for small amounts of collection data, rather than being deployed



Figure 1. The exhibit web page of the National Palace Museum and the Tokugawa Art Museum

by large cultural heritage organisations. There are several exiting problems we found:

- It is hard to understand the total amount of artefacts
- Users are difficult to understand the relations between artefacts
- There are no functions for relations of different cultures and histories
- There are no functions for the comparison of the two museums heritages
- Users can not use their history knowledge in here

2.2 The Exhibit Web Page of Famous Museums Over the World

According these problems, we started to survey several web applications of all kinds of museums all over the world and find these museums how to introduce their exhibits. Many applications for information visualisation have been developed, some researchers have already applied subjective measurements to accompany objective results.

There are many familiar examples of museum timeline applications. It is a popular way for museums to express their heritage collections by time or history classification, as shown in Table 1. They display the reigns of rulers of the major countries of the world along with commentary about those reigns and important historical events. Visually, the timeline makes extensive use of colour, shape and scale, and a few other familiar paper timelines show cultural and scientific advances. Event relations are particularly important. Viewing event relations between the news with timelines has some similarities to viewing postulated relationships between propositions in hypertext argumentation systems. With regards to interface design matters, researchers mention both typical and more

Table 1. The museum timeline applications.

Top Museums of the world		Artifacts Info.	Timeline Application
MOMA	(New York-U.S.)	△	○
Louvre	(Paris-France)	○	○
National Gallery	(London-U.K.)	○	○
Prado	(Madrid-Spain)	△	○
British Museum	(London-U.K.)	○	○
Vatican Museums	(Rome-Italy)	○	○
Tate Gallery	(London-U.K.)	○	○
Pinakothek	(Munich-Germany)	○	○
National Gallery of Art	(Washington-U.S.)	○	○
Museo Picasso	(Barcelona-Spain)	△	○
Museo Dalí	(Figueres-Spain)	○	○
Hermitage	(Saint Petersburg-Russia)	○	○
Rijks Museum	(Amsterdam-Netherlands)	△	○
National Palace Museum	(Taipei-Taiwan)	△	×
Tokugawa Art Museum	(Nagoya-Japan)	△	×

experimental visualisation techniques ranging from ranked lists, clustered result displays, tag clouds, cluster maps, and data-specific designs such as timelines. Traditional timeline systems are also incorporated into the different museum site's advanced data relations. It was conducted to get an idea of why people use the museum timeline site, and to use this input to help guide the design of a system for browsing and exploring material related to the heritage history or culture. Most users are usually required to directly select a specific year or range of times. Enhanced presentation of event-based information could include an interactive timeline, it is also of interest would be the ability to explore relationships between each heritage background. On the other hand, for visualisation systems, some researchers use the points of keywords, time, and 3D space to display visualisation interfaces. For example, Nomata³ proposed a novel visualisation system for news articles that supports the exploration, the observation, and the supplying of visual summaries of news articles. Matsumoto⁴ proposed a multi-channel dissemination system with a time dependent filter and an application technique for time-series documents on the Internet. He also took a push-based application method based on confidence and scoop levels to describe a prototype system.

2.3 Defects of the Existing Exhibit Web System

However, there are not many explanations of the relevance and background of the entire exhibition, even if they describe the concepts of the whole exhibit, it is

still difficult to appreciate and understand the link between each exhibit directly. Ogawa said the present museum is concerned to be the demand for varied requirements from our society, and it plays a role treated as endeavour to provide learning opportunities and taking them into many account of the diversity for people's demands.⁵ At present, most museums only provide the navigation and the guidance sheet as the exhibition maps. The exhibit explanation mode in the common museums only has some simple text descriptions for each work. There are not many explanations of the relevance and background of the entire exhibition, even if they describe the concepts of exhibits, it is still difficult to appreciate and understand the link between each exhibit directly.⁶ On one hand, the user has no enough knowledge and experiences to figure out the history of artefacts, on the other hand, there are without assistances for the global concept of the visitors' inevitable problem. At the moment, the exhibits learning method turns difficult to procure, and a number of visitors consider that it is hard and embarrassing to get the beneficial information or knowledge from here.⁷ Traditionally, the process of the museum interpretation is to understand the characteristics of each exhibit materials and finds out their correlation to combine the meaning of each historical relic, and acquire new knowledge through their visiting. As we know the way to interpret the history and art is quite diverse, even if we focus on certain museum, it often has more than one way, for example the text sheet or the digital guidance equipment to introduce and explain their artefact. In most historical exhibits, curators desire to convey the message for the research background and the matter of collections. The museum curator increases the introduction of materials in order to support the museum exhibits and the gallery staff guidance, as possible as they can satisfy the growing needs form the visitor for high-quality of the exhibit introduction. When visitors appreciate the artefact at first, certainly they acquire the abundant information from exhibits. Mostly museum learning use the concept of grouping the substance of exhibited objects especially for history museums. The museum provides a way to decipher the group substances on the display and artefacts, it is a process of learners' exhibit learning because the humanities museum must build an organisation of relics history and culture correlations to visitors.⁸ The visitor can obtain more museum exhibition knowledge or other practical wisdom through their experiences from the exhibition learning and visiting the museum.⁹ We analysed what kind of information constitutes museum literacy in reference to previous researches. In recent years, the museum has been changing the role into an informal learning place. According to this analysis, we outlined a pedagogical process model system and developed a computer based learning material to investigate this effect on an actual museum experience. In future museums, how to continue using the museum material is becoming an essential service for the exhibition support. If the visitor chooses more than one visit route to confer the exhibit configuration, whether the

exhibit or the total exhibition, they will have excellent communication with each other.

MUSEUM EXHIBITS SUPPORT SYSTEM

3.1 System Concept

Learning in museum is considered that visitors construct their original knowledge or experiences through museum objects as learning resources. However, it is said that they need museum literacy to interpret them, and such literacy is not an innate but acquired ability from their previous knowledge and experiences. Unfamiliar visitors tend to fail museum learning because of their lack of museum literacy. Therefore, museum should compensate their shortage to develop their learning. In fact, curators find it is hard to generalise all information and correlations of museum materials, and how to be effective in terms of understanding the illustration text or the relevance images to impress the presence of learner's pre-existing knowledge, this problem has been pointed out that the guidance knowledge of promoting the interpretation of museum exhibits is very necessary and indispensable.¹⁰ Researchers raise the lack of the museum literacy is getting serious, especially for the museum exhibit. They emphasise on a museum system which supports the exhibits and explains artefacts' background. In each history exhibition, there are abundant history information, it allows the user to have different interpretations and shows the related influence information of other cultures and historical periods as assorted exhibits.

The Museum Exhibit Support System (MESS)¹¹ is constructed by the concept of the museum cognitive orientation which is proposed to support the museum exhibits relation before making a visit to the specific exhibition of the museum. This study compensates for the lack of museum literacy particular to the foreign visitors. We propose a model of museum exhibit orientation which can aid the teaching of exhibits appreciate method and can support the visitor to understand in terms of the correlation of whole works and see Figure 2 which is the concept of the system. In previous studies, museum self-reliant literacy is a necessary ability to the museum visitor to comprehend the related exhibition, this study leads users to follow the museum exhibits correlation, because we emphasise the ability to interpret the museum literacy of the exhibit, and supporting a prior interpretation for visitors to compensate for the lack literacy of them. We construct the support system which is developed on the theme of the exhibit characteristics, and we design a system to take advantage of the Chinese and Japanese history museum collections. This project includes both how to take advantage of museum material, and uses it for the purpose of developing a more convenient museum support system. This study intends to

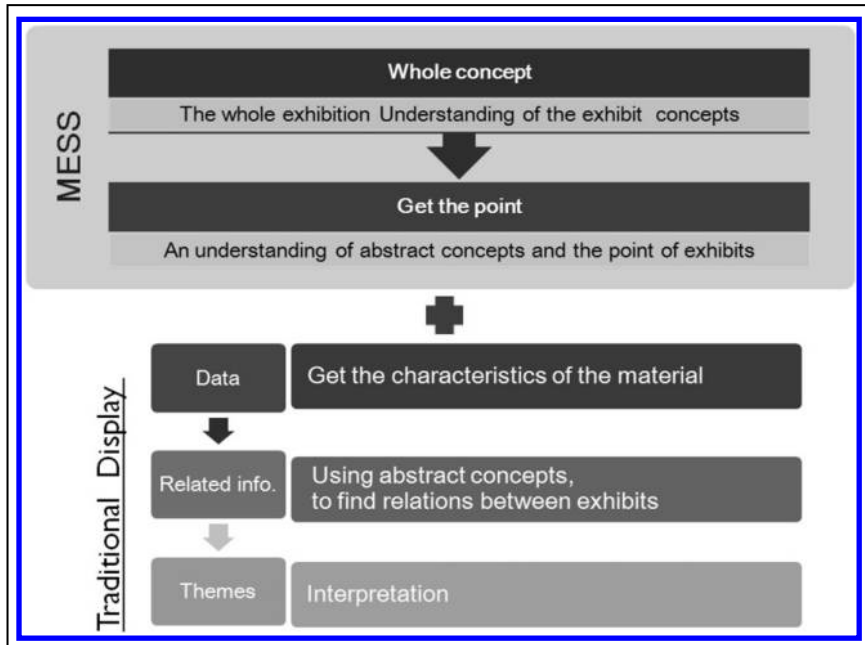


Figure 2. The main concept of museum exhibits support system

propose a way to help museum visitors to construct an interpretive framework for studying objects.

3.2 System Applications

The MESS is mainly constructed by the user interface, and the collection database. The first step of system construction is to capture heritage data from websites. Before constructing the museum timeline system, we classified and analysed the museum collection data in websites of the 'National Palace Museum' (<http://www.npm.gov.tw/index.html>), and the 'Tokugawa Art Museum' (<http://www.tokugawa-art-museum.jp/index.html>) use the collection content of each museum object as basic data. Setting various countries representative history museum as our objects, and capture all information from museum websites. The results displayed in all the views are constrained by the values selected in both history events and heritage facets. We want to show the different history museums heritage data by an interactive application for foreigners. The user can easily understand and collect information through this system. This system is based on temporal data from museum database, and provided the

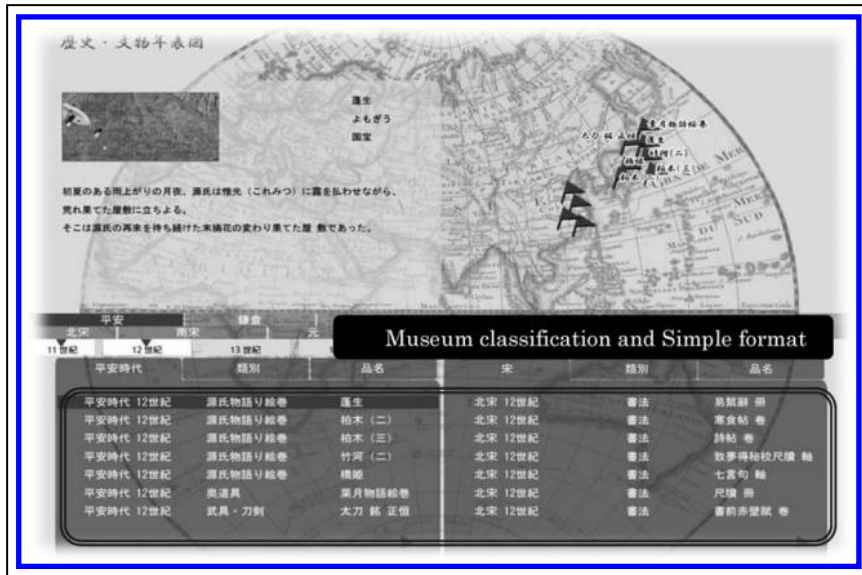


Figure 3. The concept of system application: Museum Classification. We have two or more museums, national and cultural information are simultaneously visible in here.

user with powerful data manipulation and graphical visualisation tools. It might become a basis of an interactive digital museum system for China and Japan heritages especially for foreign users. A useful interface could show links in response to show the useful information for the user's queries and explain it. In this system, the user is able to scroll the timeline horizontally to show different time periods. The prototype allows users to explore the collection by applications of the timeline, the world map and the museum classification from Figure 3.

3.3 The Concept of Timeline

Interactive timeline interfaces of the museum could enhance traditional collections information and it is an effective aid for understanding relationships among events to see it such as in Figure 4. For instance, relevant information could be displayed to a user and the user could browse for additional information as needed. Prototype interfaces are described which allow users to scroll the time bar and select from multiple timelines to display attributes of every event.¹² Chronology can provide the integration across many different parts of history. The user could be oriented to a specific time period with a dynasty of timelines. Temporal information can also be presented in tabular form, for some

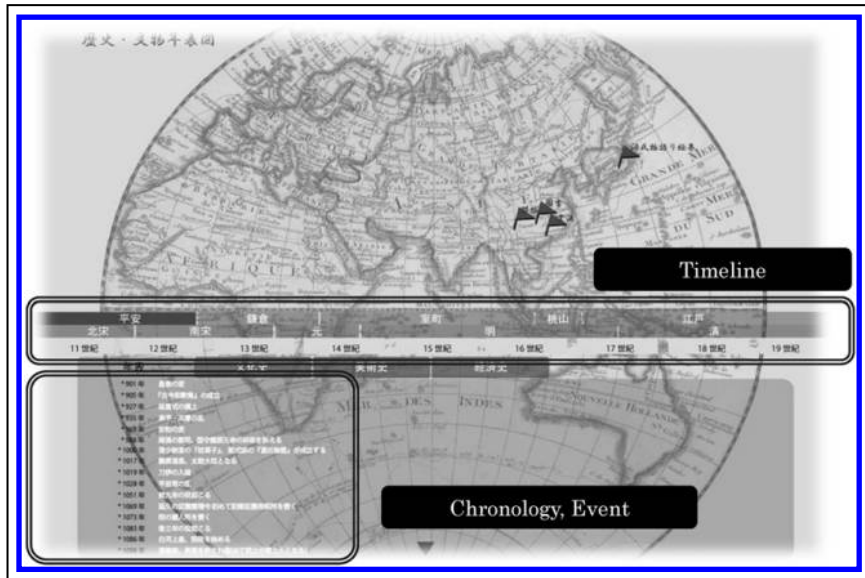


Figure 4. The concept of system application: Timeline. The collection information can be compared in this application, the expression is easier to understand by the timeline menu; we appear the age and collection by historical chronology and presenting the history event and collection background directly.

purposes that may be a satisfactory representation. Tabular presentations may be characterised as showing ordinal representations while graphical timelines generally provide interval representations. Clicking on times on the timeline gives more information about other museum works during that century. Given a sophisticated representation of a history period, it might be possible to apply complex reasoning to the relationships collected in the database of historical facts. However, reasoning from large collections of complex information in knowledge representation systems has needed in a museum artefact system. The interface shows timelines being split and merged, it also shows the explanation of heritages which give a visual representation of major history events.

Illustrated timelines of the heritage history could be developed in which the influences on any work selected by the user would be illustrated with extensive graphics or pictures. Upon investigation, the most notable difference being the percentage of people who would find it useful to explore relationships. For example the timeline of the Chinese dynasties, the user has clicked on the label for the Sung Dynasty and all history descriptions of the events within that dynasty has been opened to display more details. Therefore, the user can see both the overall context for a particular period as well as viewing specific

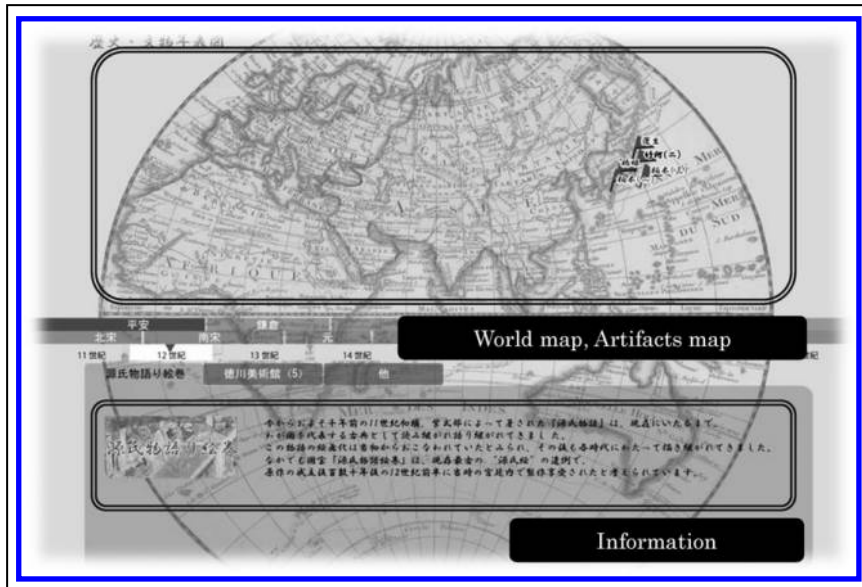


Figure 5. The concept of system application: World Map

relations between each event. Reference events from political history and the history of heritage relations have also been shown. Ideally, these reference events would help to orient each well known event and set their associations. The user clicks on a time period to open a window where other related information can be found.

3.4 The Concept of World Map and Museum Classification

Because a spatial extent is useful to select for the organisation of information on digital media, and a wide variety of geographic information system interfaces are currently being developed. It would be possible to combine temporal information with spatial information. Moreover, maps interact in causal explanations, by concept of world map and artefacts map, this system can improve the problem that only a basic facility for exploring relationships was implemented, using the interface and the user can see the information on immediately related collections which likes as the Figure 5. A world map interface may provide several types of cognitive advantages for a user; it can provide the basic information about the positions of artefacts; it can show all contexts and can help the user to compare artefacts; it has the characteristic to encapsulate; and it also can show all attributes or a hypothesised causal relationship by artefact information. This

study attempted to explore the feasibility of history museums in the context of a larger online heritage collection, with an emphasis on different country background of task and user. The interface applies the history period between China and Japan by the horizontal layer, this style is especially suitable for displaying bounded artefacts such as the history or the museum collections. It is also convenient for displaying multiple bounded attributes. When clicking on objects in the interface can have a variety of artefact information. We want to help the user from different cultures, and make it possible to understand the cultural relics and museum information. Moreover build a useful education system according their needs and knowledge. This system integrates the cultural relics data of two museums and builds a new format, and develops a new cultural relics system which uses history museums data as a radical. In other hand, to use the existing digital resource of NPM and TAM effectively and to make the user range more popular, even the foreign learner also can use it. If an expert on China and Japan history might want far more detail displayed about that topic than the ordinary user, precisely predicting which information will be relevant for a user is difficult. But the most complex issues in the design of interactive interfaces have been the layout of the museum objects. Therefore, the MESS is possibility of accessing other links in different languages such as English, Japanese or Chinese via the collection introduction is deemed to be useful, in order to further the users' information seeking and exploring process. Using the program may be configured so that clicking on objects may also produce other timelines and artefact map of different museums.

CONLUICATIONS AND FUTURE WORK

The MESS integrates the cultural relics data of two museums and builds a new format, and develops a new cultural relics system which uses the National Palace Museum and the Tokugawa Art Museum data as a radical. This was mainly due to this system provided relatively wide network of relationships between the collections of the Chinese and Japanese museums. The focus of the content related specifically to the histories and heritages. The initial results indicate that users can have different information seeking needs, depending on event period in the heritage domain, and reasons for visiting a museum collection-related system. And it might become a basis of an interactive digital museum system for China and Japan heritages especially for foreign learners. The MESS is an interactive data collection and visualisation tool which supports both heritages of the history museum. It accepts many diverse types of temporal data and provides the user with useful application and graphical visualisation tools. As the next step, we propose a useful museum exhibits support system, and build an interface of information terminal for digital contents in a museum. This system will be constructed by the website, and test the system using the exhibit touch

monitor equipment. It will capture the data about artefacts and museums and then provides users with appropriate relic information from inside the museum to outside by the internet.

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END NOTES

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