ICOA1345: THE APPLICATION AND PROMOTION OF GEOGRAPHIC INFORMATION SYSTEM IN THE NARRATIVE CONCEPT OF CULTURAL HERITAGE

Subtheme 03: Protecting and Interpreting Cultural Heritage in the Age of Digital Empowerment

Session 2: Use of Digital Technology for Dissemination and Interpretation
Location: Silver Oak 2, India Habitat Centre
Time: December 14, 2017, 10:10 – 10:25

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Abstract: The study on the protection and reuse of cultural heritage in the world generally emphasizes that people will be able to understand the sustainable values of cultural heritage through learning and education, science and technology information, together with public participation. This study was conducted in accordance with a case study of Chiung-Lin Settlement in Kinmen County (Taiwan) to develop a Story Map display platform based on Geographic Information System (GIS). The Chiung-Lin Settlement includes 8 national monuments, 3 historic buildings, 400 traditional houses and 2 listed intangible cultural heritages. This project would like to create a digital presentation for Chiung-Lin Settlement through theme stories and people-friendly functions of which contents include maps with geospatial data, texts, 2D, 3D and panorama images, etc., to achieve goals and objectives for making the public understand and appreciate the values of cultural heritage along with public transmission. Furthermore, in order to strengthen people's use of digital technology, China University of Technology particularly cooperates with Interactive Digital Technologies, Inc. (Esri's official distributor in Taiwan) to promote digitization and its applications in theme stories. Under this project a national competition was organized, and there were a total of 98 undergraduate student groups and 105 senior high school student groups participating in this competition. Prizes were awarded to the top 3 teams in each category. This activity could enhance students' organizational competence in theme stories and values. The display platform also revealed the importance and promotional function of education in the preservation of cultural heritage.

Key words: story map, interpretation, dissemination, village

Introduction

The international charter trend is mainly formed by the concept of place from points to surfaces which covers both tangible and intangible cultural heritage. It attaches importance to the value description of authenticity and integrity in heritage and achieves the sustainable development of cultural heritage through management and monitoring. In addition, public participation is also the main issue in recent years. ICOMOS pointed out the importance of localization, local communities, and public participation and so on in the Paris Declaration in 2011. In 2014, the organization proposed in the "Florence Declaration" that the bottom-up approach can effectively preserve and manage the heritage, connect to local socioeconomic development, and promote the standardization of useful new technologies and tools which can share cultural growth.

The final purpose of digital data production for cultural heritage is promotion and application. Users can obtain the collected information through the management system and the communication technology. The purpose of digital data preservation for cultural heritage is to transmit knowledge left by our predecessors. Digital technology allows people to share knowledge and preserve information. On the other hand, digital data can also become important materials for decision-making and value-added application. Thus, it can be seen that heritage information management concept has been gradually formed. In addition, the extensive use of digital technologies, such as 3D laser scanning, photogrammetry 3D modelling and GIS technology which can access to large data allow us to preserve details and related data of cultural heritage more completely. These digital technologies can also be used in more diversified value-added application and promotion.

Background

In response to the Sharjah Initiative of United Arab Emirates in May 2012, ICCROM organized a regional seminar in which nine brief conclusions were presented. The second conclusion mentioned: «It shall and amplify efforts to document and develop national inventories of all cultural assets, ideally using GIS, starting at the local and district levels. Such inventories need to be compatible in order to ultimately develop a regional database covering both movable and immovable heritage. » Thus, it can be seen that relevant international organizations have a fair understanding of the application of digital tools and pay much attention on it. The geographic information system can not only show locations of cultural heritage but also show changes of time axis. If the details can be recorded in the system, it will be more useful for future applications.

Today's geographic information system-based display platform has been gradually used to present cultural heritage information. Combined with interactive maps in consideration of the surface, data changes can be shown by geography, time, events, issues, trends of the context. For examples, Grammalidis and Dimitropoulos used the results of intangible cultural heritage digitalization for i-Treasures in 2015 to establish a new digital platform; in cooperation with the Columbia University, Burnaby in Canada created a tangible cultural heritage navigation platform with the story map to provide the public with the function of identity. Through appropriate methods, ICT technology can be applied to narrow the gap between cultural heritage and learning (Ott and Pozzi, 2011)

This study will be conducted in accordance with a case study of Chiung-Lin Settlement in the Kinmen County (Taiwan) to build a display platform based on the concept of story. Chiung-Lin Settlement is the first legal settlement registered as cultural heritage. This settlement is known for its long history and high cultural value, including rich tangible and intangible culture. Currently, there are 150 traditional settlements in Kinmen County, Taiwan. Their traditional and western style buildings possess extremely high humanistic values. However, the development of this area remains relatively low for decades under the influence of the military control period.

Chiung-Lin Settlement is the highlight of the existing 150 settlements in Kinmen. More than four hundred traditional buildings are preserved here. Minnan year festivals and important civic culture are still alive in this field. Due to its rich history and culture, Chiung-Lin village retains the integrity of Minnan culture.

Fig.1– Chiung-Lin Settlement.

"Chiung-Lin Ancestor Worship" held in the spring and autumn each year has been registered as intangible cultural heritage. It is a valuable asset in Chinese society.

Digital integration presentation of the historical scene

Taking Chiung-Lin Settlement in Kinmen as the platform, tangible cultural heritage such as national historic monuments and historical buildings as the scenes, and intangible cultural heritage such as ancestor worship, industries, and folklore activities as software, the preservation and activation of the traditional culture during the long historical process is reproduced through the support of digital technology and multiple projects. It is not only to simply reproduce the historical field but also make the public to think about the field. After heritage preservation and multiple participation in civic culture activities as important historical scene elements, important tangible and intangible cultural resources of Chiung-Lin, the first Kinmen "settlement, " can be reproduced and integrated into civic lives. Simultaneously, new cultural activities and scientific and technological resources are introduced to lay the groundwork for sustainable development of Chiung-Lin Settlement.

Chiung-Lin Settlement cultural heritage elements

There are 11 tangible cultural heritage architectures in Chiung-Lin settlement, including national monuments such as 7 Cai Ancestral Halls and the Yigu hall, a county monument (Three Widows Chastity Arch) and two historical buildings: First-Degree Scholar Cai Han's house (A) and (B). Intangible heritage include "Chiung-Lin Cai Family Ancestral Shrine ancestor worship ritual, "Wind Lion God" and potential

cultural heritage spots (including Minnan traditional buildings, civil defence tunnels and other potential resources) as illustrated in Fig.2.

Digital navigation integration display platform

This study used digital technology to assist in drawing up the overall presentation framework, including tangible and intangible cultural heritage preservation. The digital technology based on geographic information platform provides with intuitive, graphical story map interface and historical story description to present information in a more diversified and interesting way. Therefore, tangible cultural heritage can be understood, interpreted, preserved and value-added effectively. Intangible cultural heritage can be inherited from generations to generations to form a complete cultural heritage preservation system. Additional contents include information interpretation, 3D laser scanning, UAV images, photogrammetry, panorama images, video and other data presentation. The navigation system contains a map interface and introduces cultural heritage and its digitalization results based on the story concept as illustrated in Figure 3.

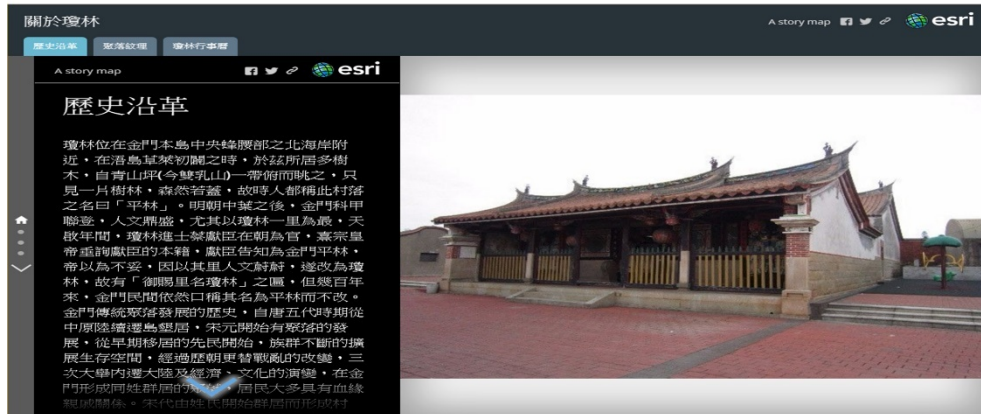*Fig.2 – Chiung-Lin Settlement cultural heritage elements*

Fig.3– Navigation system interface.

In the past, the geographic information system only focused on space presentation. However, Story Map derived from the above system integrates the time concept and presents the information through stories. In other words, the modified geographic information system can effectively convey the overall time and space background changes. Compared to previous web pages which is only presented in the form of texts and pictures, Story maps can provide with intuitive and graphical user interface to present and inherit information in a more diversified and interesting way as illustrated in Fig.4.
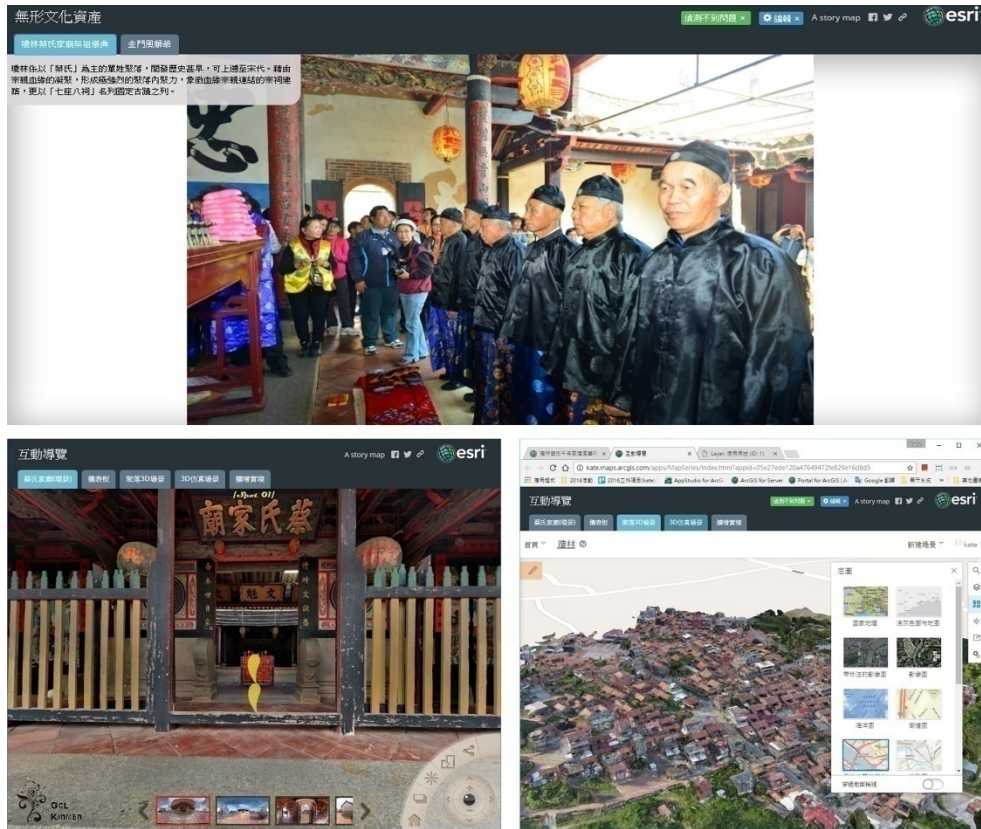
Fig.4– Chiung-Lin Cai Family Ancestral Shrine ancestor worship ritual and digital contents navigation.

Story Map application education promotion activity

China University of Technology and Taiwan's Esri Interactive Digital Technologies (IDT) long-term have cooperated for a long time to promote the application of STORY MAP, such as organizing the "National College and High School StoryMap Campus Competition, "to add the subject of Open Data innovative application so that students can explore personally the potential of open information in public participation. With their creativity and deep observation, they used ArcGIS Online to combine different types or domains of open information to show the depth and breadth of StoryMap works. They also found out the context behind to present on the map and communicate their own stories. This activity could enhance students' organizational competence to theme stories and values. There were a total of 98 undergraduate student groups and 105 senior high school student groups participating in this competition and the first three positions were selected among participants. Case results from undergraduate and senior high school student winning groups include "discovery the beauty of Taiwan in 300 years ago with ArcGIS, " the "earthquake map - Meinong earthquake information map," "the gods and temples in Taipei," and the "historical tide stagnation points" as illustrated in Fig.5.
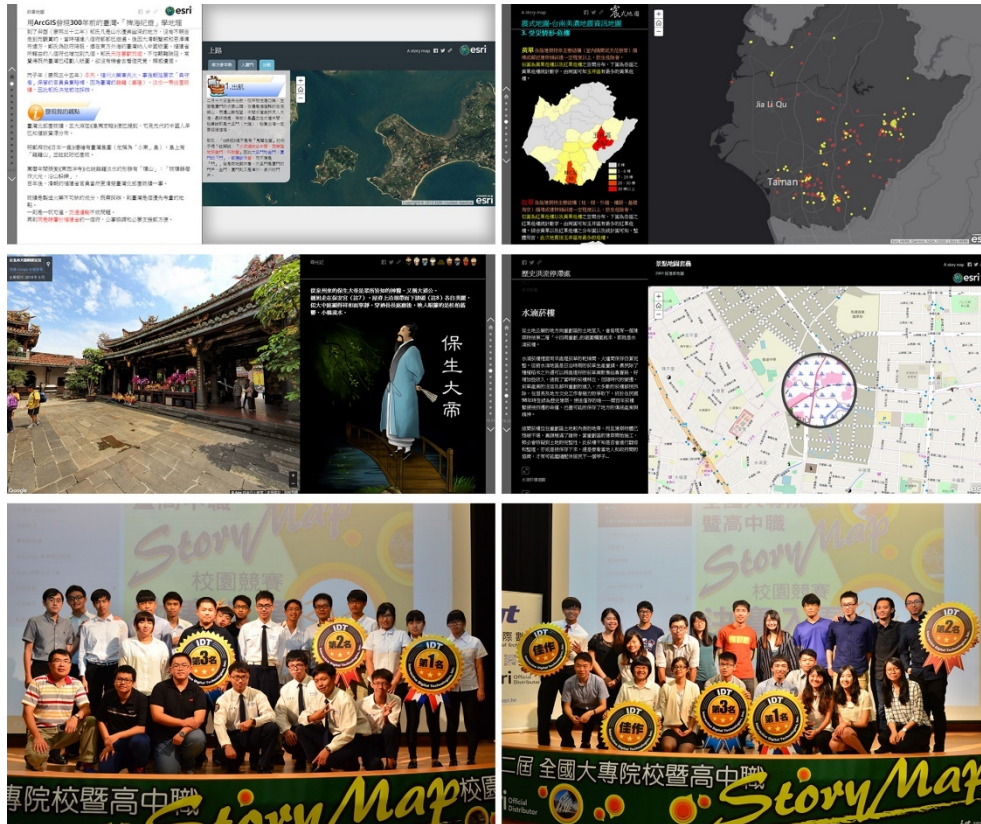
Fig.5– Winning exhibition cases and award photos (provided by IDT).

Conclusion

In addition to digital records and archives of cultural heritage, digital technology has been used internationally for applications such as basic digital technology research, technology development, digital applications and value-added education promotion for cultural heritage preservation driven by UNESCO and ICOMOS in recent ten years and made a great progress. Among nine elements of the World Heritage Nominations, description, management, monitoring and archives parts are almost all integrated with digital technology. In accordance with the international trend of historic monument knowledge management presentation and promotion of the public participation, how to provide multiple diversified digital technology services combined with public participation and resource sharing from points to surfaces has become an important topic of general concern to all countries in the world at present. In response to human values reflected in cultural heritage and landscape, it shows the importance of heritage and fields. Through new technology platforms and simplification tools for public participation and knowledge sharing, the goals of cultural heritage record application and educational promotion can be achieved.

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List of Figures

ICOA1345: L'APPLICATION ET LA PROMOTION DES SYSTÈMES D'INFORMATION GÉOGRAPHIQUE DANS LE CONCEPT NARRATIF DE PATRIMOINE CULTUREL

Sous-thème 03: Protéger et interpréter le patrimoine culturel à l'ère de l'autonomisation numérique

Session 2: Utilisation de la technologie numérique pour la diffusion et l'interprétation
Lieu: Silver Oak 2, India Habitat Centre
Date et heure: 14 Décembre, 2017, 10:10 – 10:25

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Wun-Bin Yang est enseignant au département d'architecture et chercheur au Centre de recherche sur le patrimoine culturel de la *China University of Technology* (Taiwan).Il a 10 ans d'expérience en conservation numérique.Mr. Yang est candidat au Ph.D. au *College of Design* de la *National Taipei University of Technology* à Taiwan et il a publié plus de 20 publications scientifiques dans des journauxinternationaux et des conférences, principalement sur le sujet de la documentation des monuments (Scan laser 3D), la photogrammétrie, les SIG et les techniques numériques.

Résumé: L'étude sur la protection et la réutilisation du patrimoine culturel dans le monde souligne généralement que les gensseront capables de comprendre les valeurs durables du patrimoine culturel à travers l'apprentissage et l'éducation, la science et l'information technologique, le tout avec la participation du public. Cette étude a été menée en lien avec une étude du cas de l'établissement de Chiung-Lin dans le comté de Kinmen (Taiwan) pour développer une plate-forme de diffusion de carte narrative (*Story Map*) basée sur le Système d'Information Géographique (SIG). L'établissement de Chiung-Lin comprend 8 monuments nationaux, 3 bâtiments historiques, 400 maisons traditionnelles et 2 patrimoines culturels immatériels inscrits. Ce projet voudrait créer une présentation numérique de l'établissement de Chiung-Lin à travers des histoires thématiques et des fonctions conviviales dont les contenus incluent des cartes avec des données géospatiales, des textes, des images 2D, 3D et panoramiques, etc. avec pour buts et objectifs d'amener le public à comprendre et apprécier les valeurs du patrimoine culturel ainsi que la transmission publique. De plus, afin de renforcer l'utilisation de la technologie numérique, la *China University of Technology* coopère particulièrement avec *Interactive Digital Technologies, Inc.* (distributeur officiel d'Esri à Taïwan) pour promouvoir la numérisation et ses applications dansles reportages thématiques. Dans le cadre de ce projet, un concours national a été organisé et 98 groupes d'étudiants de premier cycle et 105 groupes d'élèves du secondaire ont participé à ce concours. Des prix ont été décernés aux trois meilleures équipes de chaque catégorie. Cette activité pourrait améliorer la compétence organisationnelle des élèves dans les reportages thématiques et les valeurs. La plate-forme de diffusion a également révélé l'importance et la fonction promotionnelle de l'éducation dans la préservation du patrimoine culturel.

Mots-clés: carte narrative, story map, interprétation, diffusion, village