# Engaging museums: developing collectioncentred activities for visitor involvement in the universities of Wuhan, China

Luwei Fan, Wan Ni & Hao Jiang

## Abstract

Ninety percent of the world's data has been created in the last few years. Digital media, combined with the internet and personal computing has caused much disruption in many fields, including museums. Accordingly, digital exhibition designs are frequently adopted in museums to expand community engagement. A comprehensive digital strategy has become a critically important part of planning for long-term institutional sustainability. However, some museums, especially university museums, may have budget restrictions and complex management systems that hinder the development of an innovative digital strategy. Meanwhile, concerns about the distractive effects of technology in the museum are prevalent in some quarters. How do we design interpretive experiences that facilitate profound visitor engagement with museum collections in the digital era? This is a question for all museums. This paper explores key trends and challenges for university museums in the new era, and proposes a solution, through a case study, that balances the technology and collection objects by organizing themed activity related to the museum collection. This is a cross-institution collaboration that matches the formal training of visiting groups. We outline the successful experience of a field trip activity on the themes of the optical effects of gemstones developed by the Hubei University Museums Association. Among the collection-centered theme activity, a university-company-school model is created to enhance visitors' understanding and interest in the collections.

## Key trends, challenges for university museums in the new era

Digital exhibition designs are frequently adopted in museums to expand their communities in recent years as the result of rapid developments of digital media. Predictions about the trends in museum work include increasing collaboration between museums, and a focus on the power of data analytics to inform museum operations (New Media Consortium 2015).

Challenges for museums in the coming decade are summarized as:

- a. expanding the boundaries of creativity,
- b. rise of private companies in museum education,
- c. increasing cross-institution collaboration,
- d. increasing focus on data analytics for museum operations,
- e. expanding the concept of visitors,
- f. increasing focus on participatory experiences (New Media Consortium, 2015).

As a result, digital strategies including mobile-friendly apps and social networks are developed in most museums. Meanwhile, the unique practicality, innovative expression and powerful impacts on the senses enable museums to develop interactive aspects in formal education.

Under the influence of the rapid development of the economy, science and technology, regional human environment and quality of life in China, the status of museums in public services has been continuously improved, and their functions have been constantly evolving. Education has become an important social responsibility of museums. Museums have been highly valued by China's government. In 2007, the joint proposal of the Chinese People's Political Consultative Conference (CPPCC) National Committee members "to bring museums into the national education system" suggested that "the relevant departments pay more attention to the resources and position role of museums, and study the establishment of museums to participate in the national education system... Realize the effective connection between museum education and school education, make the museum really become the necessary supplement of classroom education for teenagers and the important content of off-campus education, and provide better service for building a learning society".

University museums as one of the most important "members" of the museums family undertake more responsibility in public education, they are exposed to the similar challenges of public museums. However, as a secondary unit within a university can face more difficulties with administration, funding and qualified human resources in comparison with public museums to develop the digital strategies to adapt to new audience demands.

Besides, ongoing studies continue to highlight the distractive effects of technology on the human cognitive function (PUENTE 2017); a recent psychological study proved the existence of a "photo-taking impairment effect" among test subjects who remembered objects in less detail because they had captured images of them (National Public Radio Staff 2014). With the abundance of new media content, technologies, and emerging participatory options combined with a long tradition of a reflective atmosphere, there is a growing concern that museums should maintain an ambience that lends itself to deep contemplation and reflection on cultural works (KOVAL 2017). In these circumstances, museum programs encouraging audiences to have profound interactions with collection objects, while also making the most out of digital tools seems an appropriate way for university museums to develop their own education style for the public.

# Development of Hubei University Museums Association

#### University museums in Wuhan

Hubei, with the land area of 185,900 km2, is located on Jianghan Plain, central China (fig. 1). As one of the best developed provinces in education and scientific research, Hubei possesses 129 higher education institutions, including two of the Top 10 Universities in China and 7 universities listed in the National Top Level University 211 Project. Project 211 is a project of National Key Universities and colleges initiated in 1995 by the Ministry of Education of the People's Republic of China, with the intent of raising the research standards of high-level universities and cultivating strategies for socio-economic development. During the first phase of the project, from 1996 to 2000, approximately \$2.2 billionUSD was distributed (LIXU 2004).

Among the remarkable number of higher education institutions in Hubei, Wuhan, the capital city of Hubei is a significant metropolitan area which has the biggest share in the number of both universities and undergraduate students in Hubei. It is reported that there are 89 universities with an undergraduate population of 1.2 million at the end of 2017.



Fig. 1 Wuhan located in eastern Hubei From: http://weili.ooopic.com/ weili 10495667.html



One third of Wuhan universities have museums. Coincidently, most of them are concentrated in the Wuchang district (fig 2). However, university museums in Wuhan differ from in size, development, expenditure and professionals etc. Table 1 lists some representative information about the university museums in Wuhan.

University museums in Wuhan have the following three features:

1) Abundant collections supported by discipline expertise

Fig. 2

museums in Wuhan From: http://weili.ooopic.com/ weili 15987836.html

Distribution map of main university

Compared with the other types of museums, university museums in Wuhan have abundant collections related to university disciplines. For example, Yifu museum at China University of Geosciences has a collection of 30,000 items covering fossils, gemstones, minerals and rocks (fig 3). Some collections items in university museums have a unique value. The ancient coin "Taichangtongbao" (fig 4) stored in the museum at Zhongnan University of Economics and Law is the only coin left from the Ming Dynasty, about 600 years ago (fig 5).



Fig. 3 Fossil wall of *Traumatocrinus* guanlingensis sp. Nov covers 15 m2 In: Yifu Museum at China University of Geosciences



#### Fig. 4

Numismatics stored in Zhongnan University of Economics and Law illustrate the financial history of ancient China. a. Money cowry was used in the Xia dynasty, China (2097 BC) b. Knife coin used in Spring and Autumn Dynasty (770 BC) c. Ant nasal currency in Warring States Time, China (475 BC) d. First Emperor of Qin standardized the currency (259BC-210BC)



Fig. 5

"Taichangtongbao" coin stored at the museum of Zhongnan University of Economics and Law is the only one of its kind known in the world

#### 2) Obligations on professional education and science popularization

When we look back at the early development of university museums in Wuhan, it is not hard to identify that professional education was the only task at that time. As time has progressed, the abundant collections, logical scientific knowledge, rich research background of university museums can attract the interest of public audiences. Recently, most university museums are open to the public and take on the obligation of popularizing science.

3) Imbalance of development

Even university museums in Wuhan that have frequently come to public attention in recent years are sometimes trapped in a predicament due to complex administrative arrangements, shortage of funds and a lack of professional development. At present, most of the museums in universities in China are under the administrative management of universities. As a result, these university museums have no independent legal entity, which means they are not qualified to be registered with the Tourism Ministry and they cannot get policy and financial support from the other departments outside of the Education Ministry. However, the Education Ministry doesn't have a corresponding department to organize the development of university museums. This restricts the progress and the social educational function of university museums (RONG ZHENGTONG 2017).

The imbalance of these university museums can show in exhibition areas, specimen quantity, visitors and staff numbers. Some museums have special collections but limited exhibition space (e.g. No. 2, 4 & 5 listed in table 1), some museums have vast space for exhibition but do not open to the public (No. 3 listed in table 1), while some lack staff (No. 2, 4 & 5 listed in table 1). These museums all face the challenge of budget shortfall and rapidly developing technology.

No.	Name	Area	Collections	Visitors	Staff
1	Yifu Museum at CUG	5000 m2	30000	124000 p/year	14
2	Bee Museum at HZAU	350m2	3000	10,000p/year	3
3	Naval Museum at WHNEU	8000m2	5	By reservation	19
4	Naval Museum at WHNEU	600m2	2000	Internal open	2
5	Specimens Center at HZNU	700m2	24,010	By reservation	1

Basic information of representative university museums in Wuhan

Table 1

Notes: CUG-China University of Geosciences, HZAU-Huazhong Agricultural University, WHNEU-Wuhan Naval Education University, HEC-Hubei Economy College, HZNU-Huazhong Normal University

#### Establishment of Hubei University Museums Association

In the spring of 2013, a meeting was held at Yifu Museum, China University of Geosciences under the auspices of the Hubei Museums Association (HMA) to discuss the idea of planning a conference to address the status and future of research within university museums in Hubei (fig 6 & 7). In recognition of the cross-disciplinary nature of the topic, but also in an attempt to explore common and diverging concerns, Hubei university museum committee, chaired by Xu Shiqiu, was formed. The committee included willing representatives from art, history, and science museums. The members were expanded from 13 to 27 over the following four years.

The purpose of the Hubei University Museums Association (HUMA) is to integrate resources, share experiences, solve problems, and stimulate development. Activities take place in the association are an annual assembly, conference, seminar and investigation.



Fig. 6 HUMA member - Yifu Museum at China University of Geosciences



Fig. 7 HUMA member - Wanlin Museum of Wuhan University

In 2014, Hubei Provincial Science Association formed the basis for popular science education, university museums and popular science featured as tourist attractions in a "popular science tour in Hubei" and associated activities, through information technology, the internet and other modern means of communication.

This series of activities shows that the Hubei government has realized the importance and necessity of the integration and utilization of university museum resources. But the interaction in between the university museums is still in an early stage, it has not yet been deeply integrated and linked. In order to explore the potential of university museums in education, strengthen the cooperation between the museums and enterprises, provide the museum audience with personalized education program, HUMA designed a series of programs which integrated the energy and resources of its members.

## **Collection-centered theme activity**

Collections in university museums are the tokens of local prestige, displaying and viewing the variety of nature and the products of human culture demonstrates a community's wealth and commitment to self-improvement. The focus on University museums had much in common with the development of a capacity for science popularization of specialized research and technical training for the public (WEIDENHAMMER & GROSS 2013). However, the basic exhibition of an isolated specimen cannot deliver multi-level connotations to audiences. Moreover, it is hard to develop the cultivation of scientific exploratory spirit and an aesthetic sentiment with static specimens. HUMA organized a work team to explore the interdisciplinary connotation behind the exhibition item, followed by the design of activities centered on it. One of popular collection-centered theme activity was "Magic gemstones" based on the optical effect of chatoyancy (also known as "Cat's eye effect").

#### Concept design of magic gemstones activity Introduction of exhibition item

The Gems & Jade Exhibition Hall is the audiences' favorite location within Yifu Museum at China University of Geosciences. In among the "Optical Effect of Gemstones" exhibition is the chatoyance, color-changing, asterism, play-color effects of special gemstone items. However, some investigations with a questionnaire and interviews about the visitors experience in the museum indicated that visitors had no notion of the theory of these effects on account of the limited didactic labelling and inflexible display. In fact, the theory of the chatoyance effect accumulates knowledge from mineralogy, crystallography, photology, gem cutting processes and aesthetics. The chrysoberyl minerals "cat's eye effect" is a media to connect these disciplines. Knowledge about chrysoberyl cat's eye is also linked with instructional objectives of junior high school science in China.



Fig. 8 Optical effects of gemstones From: Zhang Beili 2012

Fig. 9 Schematic diagram of chatoyance effect From: Zhang Beili 2012



## Designing scheme of education activity based on chatoyance effect

### a. Principles

The activity is designed to follow the principles that delivers accurate scientific opinion, focuses on the essential issues concerning resources and the environment, emphasises discipline integration, pays attention to the cultivation of an explorative spirit and ensures the integrity of the activity with regards to auditing and evaluation.

### b. Objective

Provide access for participants to understand the mineralogy, optics theory, gemstone resource of chrysoberyl cat's eye; develop the operational ability of participants with a cat's eye cutting and polishing activity; exploit the potential scientific inquiry ability by designing the cat's eye gemstone model activity.

c. Target population Junior high school students (age from 11-14)

d. Activity scale 20 students

e. Places

Yifu Musuem, jewelry quality inspection station, gemstone cutting and polishing lab, multifunctional hall

#### f. Arrangement

Date	т	ime	Contents	Location	
Day 1	Morning	8:40-9:30	The opening of camp	multifunctional hall	
		9:30-10:00	Introduction lecture of activity	Meeting room	
		10:00-11:30	Visit the museum (fig. 10)	Yifu museum	
	Afternoon	11:30-13:00	Lunch	University canteen	
		13:00-14:00	Lecture on mineralogy and gemology	Meeting room	
		14:00-16:00	Design cat's eye model (fig. 11)	Classroom	
		16:00-17:00	Visit Hubei provincial jewelry quality inspection station (fig. 12)	Hubei provincial jewelry quality inspection station	
Day 2	Morning	8:40-9:30	Gemstone photo skill practical course	Photographic studio	
		9:30-11:30	Cat's eye practical course (figs 13 &14)	gemstone cutting and polishing lab	
		11:30-13:00	Lunch	University canteen	
	Afternoon	13:00-14:00	Seminar on cat's eye effect	Classroom	
		14:00-17:00	Presentation preparation	Meeting room	
	Evening	17:00-18:30	Dinner University canteer		
		18:30-20:30	Presentation	multifunctional hall	

Table 2 Arrangement and contents of chatoyance effect activity

### g. Material

Items	Quantity	ltems	Quantity
Gemstone identification instrument set	3 sets	Fiberglass	20 pieces
Jewel torch	5	Jewelcrafting tool set	3 sets
Arc roof mould	5	Fancy iron wires	100
Lecture PPT	1	Instruction leaflet	20 pieces

Table 3 Materials list

## Activity effect and enlightenment

"Magic gemstone activity" was implemented 3 times during 2017. The program covers knowledge on mineralogy, gemology and optics. Concerning methodology, the program combines theoretical concepts and practical content together in a seminar and presentation. The learning process follows the study law of teenagers; that is *observe-study-think-explore-analyze-conclude-review* (ZHENG YI 2015).

Three types of cooperation are reflected in this process. The first type is collaboration between different units inside the university. Yifu museum, Geology Department, Gemmological Institution, Gems Identification Lab appeared in each section, to serve educational purposes. The second type of cooperation happened between university museums and enterprises dealing with the business such as organization of education activities, souvenir product design etc. Some of the experts from education companies joined the design process for this program. The enterprises also sponsored us with funding and program materials. The most important cooperation, however, is the university museum collaboration. By the organization of HUMA, the committee discussed and planned all the details of the program. The committee created the linkage between the HUMA members. In this program, Yifu museum at China University of Geosciences is the "home court". As assistant institutions, the museum at Huazhong Agricultural University provided the material on cat's eye, while Wanlin Art Museum at Wuhan University curated an art exhibition on the optical effects on gemstones. HUMA's online social media carried on the advocacy work for the program. The feedback results collected from participants, junior high school teachers and media journalists showed that the program successfully achieved the educational targets. The program helped the participants to better understand the theory behind the exhibition, built their practical experience, enlightened their curiosity, increased their concern about mineral resources, and also improved their team-work.

Fig. 10 Students visited the museum during the Technology Elites Program Photo: Luwei Fan

Fig. 11 Students designed cat's eye mould during the Technology Elites Program Photo: Luwei Fan









Fig. 13 Cat's eye mould designed by participants during the Technology Elites Program Photo: Luwei Fan

Fig. 14 Glass cat's eye cut and polished by participants during the Technology Elites Program Photo: Luwei Fan



As mentioned in earlier sections, opportunities and challenges exist side by side for the university museums in Hubei. Central to this is the question of how to explore the connotations behind the exhibition items, search the connections within a variety of disciplines and match the needs of visitors with limited funding. These are the issues that face the university museums in Hubei. The natural advantage of a concentrated geographic distribution of university museums in Hubei inspired the HUMA as a solution to accelerate the development of the entire group by the creation of a museum cluster (fig 15) and construction of a platform to share resources. In this way, the collections in the museums are no longer isolated and unchanging. The collection-centered activities show possibilities for developing the education potential of exhibition items. In addition, the programs designed by HUMA include a preparation section, a practical section, an evaluation section and a modification section. In this way the program becomes dynamic and personalized.



Fig. 15 Museum cluster development model

## Acknowledgements

We would like to thank Professor Xu Shiqiu, who shared a lot of advices on design of education program. Luwei Fan would also like to thank Mrs Gao, she is the head teacher of affiliated school of Capital Normal University, who encouraged the work on the "Magic Gemstones" programs. We also want to express our thanks to the participants of this program. Their engagement and cooperation made our first attempt on collection-centered education program so successful.

## Literature cited

- K. E. WEIDENHAMMER & A. GROSS 2013. Museums and scientific material culture at the University of Toronto. Studies in History and Philosophy of Science 44, 725-734.
- National Public Radio Staff 2014. Photograph and memory: Overexposed? Camera Phones Could Be Washing Out Our Memories. https://www.npr.org/2014/05/22/314592247/overexposedcamera-phones-could-be-washing-out-our-memories (accessed May 22, 2014)
- J. E. PUENTE 2017. Examining the Effects of Distractive Multitasking with Peripheral Computing in the Classroom. Doctoral dissertation. Nova Southeastern University. Retrieved from NSUWorks, College of Engineering and Computing. https://nsuworks.nova.edu/gscis\_etd/995/. (accessed November 1, 2018)
- LI XU 2004. "China's Higher Education Reform 1998-2003: A Summary". Asia Pacific Education Review. 1, 14–22.
- New Media Consortium. 2015. NMC Horizon Report 2015, Museum Edition. Beijing: China Science and Technology Press.
- RONG ZHENGTONG 2017. Report on the development of university museums in China. Scientific Education and Museums 3(1), 18-19.
- S. V. KOVAL 2017. Theoretical Aspects of Interaction of Local and National in a Museum as the Culture Subsystem. Culture Studies 5(59), 75-77.

ZHANG BEILI 2012. Systematic Gemmology. China Geological Press.

ZHENG YI 2015. The study on museum educational activities. Fudan University Press.

#### Contact

Luwei Fan, secretary-general of HUMA, curator of Yifu Museum at China University of Geosciences Address: No. 388 Lumo Road, Hongshan District, Wuhan, Hubei Provice, People's Republic of China E-mail: 48633121@QQ.com

#### Keywords

University museum - Theme activity - Cross-institution collaboration