An Observation and Study on Exhibition Visiting Behavior in Elderly People at Suzhou Museum in China

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Abstract
The responsibility of museum is to convey messages about their exhibit projects while meeting multiple visitor expectations. One way this can be achieved is through a deliberate design and planning that draw visitors in and engage them with interactive elements. However little research has been conducted about exhibit visiting in China, especially for elderly visitors. The purpose of this study was to make a reference, which allows designers and curators to cope with the complex planning and meet elderly's needs. For a 4-week period in 2020, behavioral data of elderly were collected from 165 visitors who moved through the Suzhou Museum in China. It is predicted that both observed and reported data in this study would be related to elderly behavior areas which were emphasized in the visitor research and more effectively achieve the goal of convey messages.

Keywords
Visiting behavior; Exhibit viewing; Elderly people; Museum study

Introduction

The Museum Situation in China

In recent years, Chinese museums have developed rapidly, whether the state-owned or private museums, whether industry or characteristic, all the museums expressed the unprecedented development trend (Cheng, 2007). The construction of museums is in full swing all over the Chinese cities and towns. All the local governments and the individuals all invested a lot of money to build large

scale and characteristic museums.

In 1977, there were only 300 museums in China. Within a decade, the number had grown to nearly 830. By the turn of the century there were more than 2,000 of them. By 2019, officials estimate, there were around 5535 (Economist, 2007).

The rapid development of museums is the undisputable fact, but its cultural development doesn't keep the same pace accordingly. There is few studies have carefully described the visitor's perspective in these museums; limited studies that examine the responses from Chinese elderly visitors (Song, 2007).

The director Yang Zhigang, from the Culture Exhibition Department in Shanghai Fudan University, says that many local museums are considered to be the derived institutions of all local cultural relics departments in China, and become the best choice for arranging the designated personnel (http://wenku.baidu.com/view/80267feb81c758f5f61f67f1.html). In this way, it brought about the professional knowledge, the service level and recognition can not be keep abreast with the requirements, threatened the museum's development as well. In this sense, the museum construction should make transformation from pursuing the quantity to pursuing the quality.

The quality indicates displaying the exhibits comprehensively and establishing a comfortable public environment basing on meeting the visitor's requirements.

Study Objective

Elderly people as an important group of visitors, the requirements are different from other people, since their physical conditions and psychological reactions all changed (Guo & Duan, 2007). Moreover, with the increase of ages, they will have other special requirements physically and psychological, like be secure, be concerned and so on (Zhao, 2006). A cross disciplinenary research on the elderly's behaviors is very necessary, which can assist the museum designers to understand the actual demand of the elderly and improve the design at China.

The purpose of this topic is to explore the requirements of Chinese elderly visitors and the behavior characters in museum space. The main task is to investigate some design means through preliminary analysis on the phenomenon between space and human behavior. What interested me is that the Chinese modern elderly person how to understand a modern spaces, and how the spaces affect them.

There is no consensus on the definition of elderly person. In the context of this study, elderly refers to person aged 60 or above (China Academic Field).

Study Background

All of museums strive to convey conservation messages to their visitors effectively. However, museum visitors come to an institution with their own needs and expectations, especially for the elderly. With these expectations, elderly visitors often cite their specifically needs for recreation, entertainment and social activities. The challenge here is for museum to understanding and meet these needs while providing communicate opportunities, which effectively convey messages and exhibit facts.

One way to blend the goals of entertainment and education is through the design of immersive, naturalistic exhibits that draw in and engage visitors by holding their attention (Davey, 2005; Shettel-Neuber, 1988). On October 6th, 2006, the new Suzhou Museum, designed by I.M.Pei, was opened to the public. This museum has collected more than 30,000 cultural relics, covers two millennia of Chinese Wu History. The museum design provided a public environment for visitors to connect with nature. Also this naturalistic exhibit was designed to meet the needs of multiple users, creating a unique experience for visitors were a primary goal.

Suzhou Museum is divided into three major parts. The center part includes the entrance, frontcourt and great hall while the West Wing is designed as the main relics exhibition area, and the east belongs to contemporary art galleries (see Table 1).

To provide a public space for visitors to connect with nature, to take on a simulated safari through a new Chinese Classical Garden, Suzhou Museum was created in a combination of landscape and modern architecture together with naturalistic exhibits. Bamboos were used as symbol in every space appropriately that provided a relaxed and idylisch environment for visitors.

Additionally, each exhibit has identification panels that help audiences identify exhibits and which also provide interesting and unique facts about the objects. There are extra explication panels throughout the building, providing exhibit information.

Methods

This study toward exploring how elderly person use the spaces presented to them. A better understanding of their expectations could help to achieve the museum's responsibility more effectively.

Research Methodology

In particular, for this study it was decided to undertake a series of observations, interviews, and surveys about elderly's behavior in Suzhou Museum. The best method to assess the space using is un-

obtrusive observation. Within that, time spent interacting with an exhibit component is an important factor that should be considered in. A rigorous survey has engendered at the end to complement the tracking studies as part of an overall evaluation strategy.

Three primary objectives have designed as below:
(a) To characterize elderly's behavior in Suzhou Museum;
(b) To identify key demographic variables that may influence the elderly's behavior;
(c) To use these data to identify successful elements within the museum design.

Visitor Observations

One method that could assess exhibits is unobtrusive observation, because it provided a positive correlation between times spent at an exhibit and the engaged that takes place. Elderly who spend more time in a exhibit space or attending to a particular exhibit component are likely to know more about the content of the exhibit than are those who do not attend to the exhibit at all. Within that, timing and tracking observations serve as the basis for future research and investigation.

Data on 165 elderly visitors were collected over a 4 week period, beginning in March 2020. The observation periods took place on both weekdays and weekends between the hours of 10 a.m. and 4 p.m. and were sampled as equally as possible during these times. An observation path was designed to follow the elderly (see Figure1).

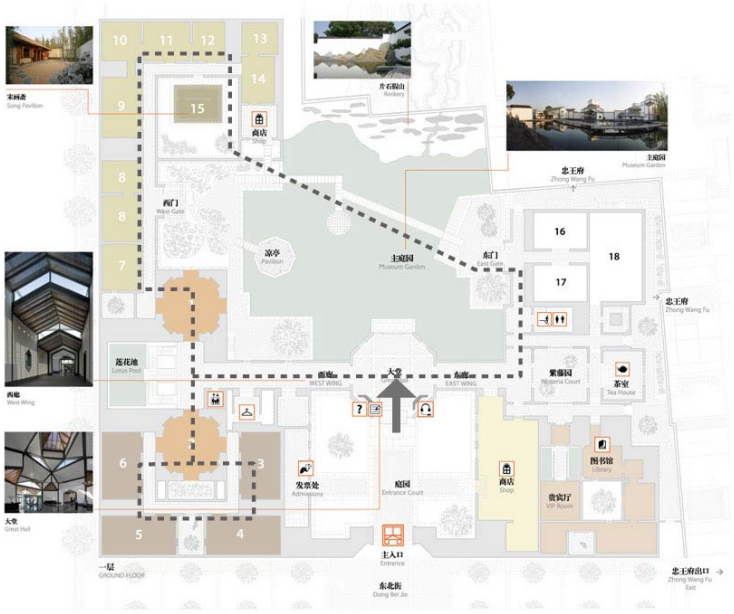


Figure 1. Ground Plan of the Suzhou Museum locations of key component. Dotted lines indicate the main paths followed by visitors, observed during their visit through the galleries.

Table 1. Suzhou Museum design aimed to introduce traditional Chinese Garden design into the existing contemporary exhibit space, designed by I.M.Pei, built in 2006.

Exhibition Components		Description
Indoor Exhibit	West Wing 1st Floor	This museum contained two main parts West Wing and East Wing. West Wing exhibited with historical relics. The organization of viewing spaces here is the single sequence, which imposes strong rules in the pattern of movement, and powerfully controls the pattern of exploration since visitors have to go through the same sequence of spaces in the same order with no option of changing the course.
	West Wing 2st Floor	
	West Wing Basement	
	East Wing	The other part East Wing that exhibited with contemporary relics. With an extreme organization is grid, which is impossible to visit in an orderly sequence, but minimizes the control that the layout places on the visitor and consequently, maximizes the randomness in the pattern of movement and exploration.
Outdoor Exhibit	Museum Garden	The outdoor space exhibited with historical relics. Green foliage was placed in the garden along a pavilion and the floor was covered with cobblestones. In addition, a curved bridge was above a rectangle fishpond.

Data Collection

Elderly people were unobtrusively observed both indoor and outdoor exhibit space. Visitors were included in this project if they appeared to be over the age of 60. Visitors who did not move under their own power, those who were carried or pushed in a stroller or wheelchair, were also included.

The amount time that each elderly spent through the museum, engaging with single exhibit, and interacting with museum staff or other visitors, were recorded. Median figures are used as primary descriptive unit for assess total visit behavior. Individual element durations, like visual contact, physical contact were analyzed.

Besides behavioral data collection, independent variables on each elderly person was recorded by observer as well. These included gender (male, female), age (young old between 60 to70; the middle old between 70 to 80; the oldest old over 80), and group (family group of less than five visitors, social group of more than five visitors (see Table 2).

Table 2. Definitions of the demographic and behavioral categories used to describe and analyze visitor behavior.

Characteristic	Definition
Gender	Visitors were labeled as either "male" or "female."
Age group	Visitors were assigned to one of the following age-groups: the young old (60–70), the middle old (70–80) and the oldest old (80+).
Group size	The number of people accompanying a visitor during a visit to the exhibits.
Behavioral Visit duration	The length of time people stayed at the exhibit; the observation zone extended from one end of the exhibit to the other.
Viewing behaviors	A viewing event was defined as an occasion when a visitor looked in the direction of the exhibit; the duration of a viewing event was classed as "viewing duration."
Stopping behaviors	A stopping event was defined as an occasion when a visitor came a standstill (ceased walking) with both feet placed on the ground; the duration of events was labeled as "stopping duration."

Table 3. Behavioral characteristics of elderly visitors between male and female.

Behavior	Group Male	Group Female
Visit durations		
No. of visitors	85	80
Median (min)	50.57	35.68
Range	75.50	30.57
Viewing durations		
No. of visitors	79	76
Median (min)	50.55	38.31
Range	45	44
Stopping durations		
No. of visitors	48	52
Median (min)	14.56	18.67
Range	7.43	12.77
Visual contact		
No. of visitors	29	44
Median (sec)	4.09	5.83
Range	6.46	6.90

Results

Several behavioral characteristics are recorded and defined in (see Table 3).

Visit Durations

The median time duration that visitors spent at this museum was 50.57 min within male and 35.68 min within female. These two median visit durations were significantly different (nM = 85, nF = 80, p = .000).

Viewing Behaviors

The two groups did not differ significantly in the time that people looked at the exhibit (Group M : 92% of visitors; Group F : 95%).

However, male visitors in viewed the exhibit for a significantly longer time (Median M = 50.55 min) compared to female. (Median F = 38.31 min; $p \leq .001$).

Stopping Durations

Significantly fewer people in male group stopped during their visits, 56% compared with female group 65%; Male visitor spent significantly less time stopping. (Group M : 14.56 min ; Group F : 18.67 min ; nM = 48, nF = 52, $p < 0.05$).

Visitors' Social Behaviors

As many female visitor (nM = 44) made visual contact with others compared with male group (nF =29). This difference was significant. Durations of visual contact times did a little differ between groups. (Male: 4.09 sec; Female: 5.83 sec). The two groups did significantly different in the number of people who physically contacted others. (Male: 43.52% of visitors; Female: 67.5% of visitors). The median durations of people's contact behaviors were significantly less in the male group (Male: 8.59 sec; Female: 17.04 sec; nM = 7, nF = 4, p < o.o5).

Table 4. Demographic summary of visitors median visit duration. (min:sec)

	N	Percent	West Wing	East Wing	Museum Garden
Gender					
Male	85	88%	50:50	8:51	10:12
Female	80	67%	35:48	6:47	14:57
Age					
Young old (60–70)	84	51.00%	30:22	4:41	5:38
Middle old (70–80)	54	32.72%	50:25	6:44	15:54
Oldest old (80+)	27	16.36%	35:18	7:52	17:43

Group					
Single	11	6.25%	46:32	10:37	18:15
Family Group (<5)	67	40.63%	37:25	3:32	24:45
Social Group (>5)	87	53.13%	48:44	4:56	13:17

The there different aging groups did significantly different in the number of people who look at the exhibition (Group Y: 51.00% of visitors; Group M: 32.72% of visitors; Group O: 16.36% of visitors). Durations of relaxing time spent in Museum Garden were much longer than East Wing, especially for middle old (Median M = 15:54, Median E = 6:44) and oldest old (Median M = 17:43, Median E = 7:52). Young old group spent the least time in the east building (Median W= 4:41 min). Duration of visit time spent in West Wing (relic exhibit) was longer than East Wing (contemporary exhibit).

More than 40% of elderly visit museum with companions. Those in large groups with family or friends were spent more time in exhibition. Only 6.25% of visitors were visit there by themselves (see Table 4).

Discussion

Suzhou Museum provides elderly visitors with a unique opportunity to experience a series of art exhibits and a naturalistic environment. This study examined how elderly person distribute their time in a complex exhibits and helps determined what demands they need.

The Demand on Health

Spending more time in the sun could help elderly cut their risk of heart disease and diabetes (Franco, 2009). According to the statistics in this survey, the elderly prefer stay longer time in the outdoor. In the 165 interviewees, 16.12% the old people would like to stay in outdoor exhibit, and 12.4% of them are willing to do indoor activity. Aiming at such the visiting reality, the rational design of outdoor space is more important to the old people.

People tend to remain on the same type of floor surface (Bitgood, 1992), but if they are forces to move another floor, most of Chinese elderly with sound action ability p
refer to take the stairs. Because they are unwilling to waste time on waiting elevators, and believe that taking the climbing exercise can keep fit. After some interviews, author found this opinion from the folk, the citizens who lived in apartment. They believe the sport could enhance the function of respiratory system and cardiovascular system; especially exercise the lower limb muscle.

The Demand on Comfort

The low vision has always been the major cause of perplexing the life of the old people's behaviors. In the 165 old interviewees, the proportion of elderly with low vision occupied 8.8%. And 3.3% of them with low vision almost give up reading the exhibition information initiatively. Instead, these old people became more sensitive to the exhibit environment, including the light intensity, the unobstructed aisles and the comfortable ventilation.

The Demand on Social Communication

Most people visit museums in a group, and those who visit alone invariably come into contact with other visitors and museum stuff (John & Lynn,1992). According to the survey, the old people who participated alone accounted for 6.65%, and who joined in visiting in small groups covered 40.60%, and in group activities accounted for 52.72%. It is clear that, the design for museum should consider the old people's psychology of concentration, and adjust the ratio on the number of tables and chairs reasonably in relax space.

In addition, the elderly unwilling to stay at exhibit space alone. Elderly visitors tend to approach an area containing other people, unless it is too congested in which case a crows may have a repelling effect (Bitgood, 1992).

The Demand on Physical Strength

Duo to the decline in physical capacities, according to the survey, 78.9% elderly visitors need to sit and have a rest after a sustain walking in 30-40 minutes. Therefore, on arrangement of the museum, the facilities for exhibition and rest should coordinate closely, so as to meet the demands of the old people.

Others

From the interview, author found that when meeting the problems during the visit, the elderly asked for help actively accounted for 4.6%, who sought for information tips by themselves on sign board occupied 30%, who sought for the distributed leaflets information in the museum covered 35%. It is clear that the reasonable distribution and carrier design in the museum construction are all very important, especially for the old people who want to prove their independence, the comprehensive information is especially important.

1. Elderly people prefer to stay on naturalistic exhibition under the sunshine. This result is in accor-

dance with other studies that also has demonstrated increased visitor interest toward exhibits with naturalistic and enrichment features (Johnston, 1998; Namiki, 2002; Wood, 1998). Therefore, museum designers should pay more attention to the smooth and non-slip surface of the floor, and avoid adopting the floor coverings with strong reflection.

2. Elderly people spend a longer time in resting area. Therefore, we should consider the rational division on the resting areas and exhibition areas from the layout of the museum. On one hand, it can alleviate the elderly's fatigue. On the other hand, it provides more opportunities to make communication.

3. The elderly with sound activity ability prefer to choose the way of taking the stairs. Therefore, in the design, we should pay attention to the non-slip surface of the footsteps, the armrest facilities and the reasonable height of steps. For the elderly person, with the limited activity ability, we should reduce the footsteps.

4. Since taking the initiative to give up reading information, a lot of elderly visitors with low vision are more concerned with the convenient use of the exhibition spaces; they are urged to be concerned. If exhibit spaces could promote this, the quality of the social experience that the elderly seek in the visit could be enhanced.

5. The old people spend more time on visiting the historical relic exhibition than on the modern museum. Their behavior patterns and facilities' context have a relation with history, and they are greatly attached to the exhibition of traditional culture and architecture. Therefore, a full use of the traditional text and design could attract their attentions greatly, so as to achieve the effect of spreading information through museum.

Conclusions

In conclusion, the elderly's behaviors in museum space are obviously limited to their physical capacities, so that with their special requirements. Through this study, the outdoor exhibits at Suzhou Museum is a successful exhibit space for Chinese elderly visitors. It is a space could attract elderly person enjoy the sunshine not only, but also read the exhibition information while communicating with their companions. That is a good example can increase elderly visitor interest, provides a strong argument to improve elderly's welfare standards and supports the ongoing museum design improvements.

This study is one in a series of elderly visitor studies recently conducted. The information gained will be used in the development of future research as well as in the overall assessment of museum

design at China.

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