

A Study on the Public Space Perception of Historical Museums Based on Text Mining

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Abstract: Under the new requirements of promoting the standardization and equalization of public cultural services, museum visits have become a new choice for the public. This study takes the online evaluation of three history museums in Ctrip platform as the research object to explore the public's spatial perception of history museums. Through text mining, word frequency analysis, emotion analysis to explore the public comment data and construct the index evaluation system. The study found that history museums from the public perspective are generally positively evaluated, with clear theme positioning and high public demand for explanation, cultural creation and ticket reservation. However, there is still room for improvement in the promotion of VR, AR and other digital resources of historical museums. Research is of great significance for improving the image and service of museums, promoting the inheritance and promotion of cultural heritage and public cultural education.

Keywords: Public Space Perception; Historical Museums; Requirements of the public

1. Introduction

History museums have a unique charm, they not only carry the history and culture of a country, region or city, but also provide visitors with an opportunity to travel through time, let them personally feel the glory and wisdom of the past. Historical museums such as Shaanxi History Museum, Xi'an Qin ShiHuang Mausoleum Museum and Shaanxi Archaeology Museum attract tourists and scholars from all over the world to visit and study with their rich historical deposits and precious cultural relics collections. However, how the image and service quality of museums are perceived and evaluated by the public has an important impact on the sustainable development of museums and the inheritance of cultural heritage.

As guardians and disseminators of cultural heritage, museums have always played an important role, not only as repositories of history and culture, but also as a bridge between the past, present and future. Traditionally, the image evaluation of museums mainly relies on the word of mouth of visitors and the opinions of professional critics, which is often difficult to obtain and subjective. However, in the age of the Internet and social media, a large number of visitor reviews and blog posts provide researchers with an in-depth understanding of public perception, which is conducive to better evaluating information such as service quality, exhibition attraction, cultural and educational value of historical museums.

2. Conceptual analysis of Historical Museums and Public Space Perception

2.1. Historical Museum

History museums focus on history and culture. It mainly displays historical relics, archaeological remains, cultural traditions and historical events, aiming to help the public understand the culture and society of the past. As the center of culture, museums are favored by the public for their rich cultural deposits^[1]. The museum, as a special place, builds the integration of people, things and fields with the help of infrastructure and supporting facilities, and the place attachment formed in the positive emotional interaction with people helps to better create economic benefits.

2.2. Public Space Perception

The public refers to all people except policy makers and policy implementors of administrative agencies. Public space bears the function of building a sense of place for groups and is the need for

emotional release, communication and identification^[2]. As an important concept in human geography, public perception is the public's overall cognition of a certain thing or phenomenon, and as part of the cognitive category, it originates from the overall evaluation of places^[3]. In the visiting experience of historical museums, public perception involves the public's evaluation of museum exhibition content, service quality, environmental atmosphere and other aspects^[4].

3. Data Sources and Research Methods

3.1. Data Sources

Based on construction conditions, daily public visits and museum grades, the study selected Shaanxi History Museum, Archaeological Museum and the Emperor Qin Shi Huang's Mausoleum Museum in Xi'an as research objects. The python program was used to climb the visitor comment data of the three museums on Ctrip platform from January 1, 2023 to August 15, 2023 into text data for public space perception analysis.

3.2. Research Methods

After re-operating the obtained review data, a total of 2095 review data of Shaanxi History Museum, 2090 review data of Xi'an Emperor Qin Shi Huang Mausoleum Museum and 296 review data were collected. In order to understand the perceived image of museums from the public perspective, the review text was cleaned by natural language processing technology, and the cognitive image system of historical museums was constructed according to the description themes involved in the 6281 evaluations by reference to the public service evaluation system and the Evaluation Criteria for Museum Operation. In order to understand the correlation between words in public comments, this paper constructs the relationship network between words through co-word matching analysis, and analyzes the spatial perception of museum from the perspective of public cognition with the help of the degree of connection between words.

In order to evaluate the emotional tendency in museum spatial perception, 22215 emotion words were constructed by referring to Hownet Emotion Dictionary, NTUSD Simplified Chinese Emotion Dictionary of Taiwan University, Li Jun Chinese Praise and Criticism Dictionary of Tsinghua University and BosonNLP combined with common words in museum public comments. The words appearing in the comments are divided and assigned according to neutral words, positive words and negative words. The positive words (such as like, professional, hope, encourage, professional, etc.) are assigned 1 point, and the negative words (such as bad comments, no, can't, etc.) are assigned -1 point. In addition, define "very, super, slightly, slightly, extremely, extremely, more, very" as degree words, assigning values of 2 points, 3 points, 2 points, 0.5 points, 3 points, 2 points, 2 points, 2 points, 2 points, and other words are defined as neutral words. For example, "The docents Miss Yang and Miss Leng are excellent, explaining history, culture, inheritance, allusions, incisive." In this clause, the words "incisive, interesting, and recommended" are defined as positive words, and the words "very, very" are defined as adverbs of degree. The clause has no negative words and belongs to the positive emotional clause.

4. Results

4.1. Cognitive image analysis

The public's cognitive and perceptual evaluation and emotional evaluation together constitute the overall positive or negative evaluation of something, that is, the composite image^[5]. Based on the evaluation data of visitors to historical museums, the study starts from the comprehensiveness, diversity, relativity and dynamics of public perception^[6], and refers to the construction of perceptual image, the evaluation system of museum announcement service and the Evaluation Criteria of Museum operation. Combined with the descriptive themes involved in the 6281 evaluations on Ctrip's official website, the classification standard of cognitive image attributes of historical museums is formed, with a total of 3 main categories and 15 subcategories, as shown in Table 1.

Table 1: Cognitive image attribute classification

main categories	subcategories	examples
Topic orientation	Social impacts	Social, economic and social
	Cultural education	Cultural heritage, Chinese culture
	Public recognition	Consensus, immersion
Cultural relics display	Collection display	Permanent exhibition, temporary exhibition
	Quantity of collection	Museum collections, rare collections
	Visiting route	Guided route
	Cultural and creative products	Cultural and creative, cultural and creative park catering
Service facility	Catering facilities	Catering service
	Rest facilities	Rest room
	Sanitary facilities	Environmental hygiene
	Safety facility	Sense of Security
	Online service	Official website
	Explanation service	commentator, guides
	Booking tickets	Book tickets
	Traffic convenience	Transportation, public transportation

4.2. Statistical analysis of high-frequency words

In combination with the evaluation system of museum public image index established above, word segmentation screening was carried out on the original data, and comments related to the research purpose from the public comment data were extracted to generate word frequency table as shown in Table 2. In the review data of Shaanxi Calendar, history, culture and historical deposits have shown distinctive characteristics, and the museum exhibits outstanding characteristics of Shaanxi and Xi 'an. Tourist comments are mostly positive comments, and the keyword "excellent" appears more frequently. Shaanxi History Museum has the Datang Treasure Hall, which mainly displays the unearthed jade and precious stones in Hejiacun and the treasure animal head agate cup of Shaanxi Libo Town Hall and other precious collections. It is a fee-paying exhibition venue, and the public has a high interest and favorable degree in the theme positioning and cultural display of the venue. The public has a high degree of evaluation and recognition of the theme positioning and service facilities of the Emperor Qin Shi Huang's Mausoleum Museum in Xi 'an. It can be found from the review data that the public pays more attention to history, culture, the eighth wonder of the world, etc., and the service attitude is also quite concerned by some tourists. Due to the terrain, the weather is also one of the topics of concern to the public when visiting the Qin Shi Huang Mausoleum Museum. Shaanxi Archaeological Museum is remote from the city center of Xi 'an, and the inconvenience of transportation is one of the aspects of public concern. The historical and cultural theme of the museum is also clear, and the exhibition route design is reasonable, and the exhibition forms are diverse, such as on-site interactive experience, video explanation of archaeological history, etc., and its theme positioning and cultural relics display have been highly recognized.

Table 2: Comments frequency statistics of public comments

Comments	Counts	Comments	Counts	Comments	Counts
history	2721	interesting	452	itinerary	267
guide	2711	knowledge	434	marvel	251
tour guide	1946	shock	424	enthusiastic	238
cultural relic	1120	teacher	384	like	236
culture	679	abundant	379	stories	215
recommended	626	booking	357	treasure	201
environment	527	ahead	322	archaeology	194
experience	514	tickets	308	collection	188
service	484	vivid	296	charge	177
China	472	world	279	mural	158

Combined with word frequency statistical analysis, the commonality of history museums in the following three aspects. First, the need for explanation is obvious. Because history museums have high requirements on the depth and breadth of knowledge reserve, although the museum has made a brief introduction around the collection display, the public has a high demand for docents and guides because

of the lack of historical information display and the need for more background knowledge reserve. Second, the evaluation of cultural and creative products is higher. The three museums designed cultural IP combined with their own special collections and designed a series of derivative products, such as TANGNIU and QIN JIASHI, indicating that the construction achievements of historical museums in cultural and creative design are highly recognized by the public. Third, it is difficult to book tickets during the tourist season. Public comments often have "tickets are difficult to get", "reservation is difficult to succeed" and other descriptions, although the museum has extended the daily opening hours, but in the tourist season, "a ticket is difficult to obtain" phenomenon is still relatively common, the future museum can continue to expand online digital resources.

In the process of word segmentation screening, almost no public comments related to "cloud exhibition, cloud explanation, cloud education (cloud courses), short video, HD live broadcast, virtual exhibition hall, immersive experience, etc. "The National Cultural Heritage Administration of the People's Republic of China issued in 2022" Evaluation Measures for Museum Operation" proposed by the digital equipment and use of this standard. However, by referring to the above three museum digital resource libraries, we can find that there are relevant facilities for display and use, but the number of users is less and the online time is shorter. It is concluded that the digital museum products of this kind of museums have received less attention from the public, and there is still some room for improvement in the publicity and promotion of related resources.

4.3. Emotional image analysis

Table 3: Sentiment analysis of public's review text

emotional inclination	Counts	N (%)
Forward direction	5663	86.511%
Partial positive direction	192	2.933%
negative	525	8.020%
Skew negative	166	2.536%

Table 3 shows the sentiment analysis of the text evaluation data of historical museums. It can be found that the evaluation of this kind of museum is mostly positive, such as "the architecture is atmospheric, the experience is good", "vividly restore the history", "the docents are very professional, and the explanation is detailed and patient". It shows that history museums enjoy a high reputation and favorable impression in the public level, and the visiting experience and history-related exhibition content are professional, and the historical and cultural restoration degree is high and the content is detailed. The number of biased emotional sentences accounted for 2.933%, such as "it is recommended not to take children, it is best to have children above grade 5 or 6, unless they are super interested in cultural relics, history and geography". While recognizing and supporting the history museums, this part of the public believed that such museums should simplify the language in the guide design. It's best to make it accessible to people with little historical expertise. Negative and partial negative emotions accounted for about 10%, such as "too many people in the team to piece together", "it is difficult to make official appointments in many museums" and so on. It shows that the public has a certain demand for optimization of museum reservation mechanism, team service and tour order.

5. Conclusion

5.1. Core image characteristics of historical museums

History museums enjoy a high reputation among the public. The main concerns of the public for history museums include history and culture, historical deposits, exhibition characteristics, service attitude, etc. It reflects its core image as an important place for historical and cultural inheritance, as well as an institution serving the needs of the public.

5.2. Perceived needs of the public

Changes in public demand have a direct impact on the attractiveness and sustainability of museums. Museum managers need to recognize the evolving expectations of the public and continue to improve the quality and attractiveness of museums based on their needs. The increase in positive feelings reflects the public's high appreciation of the educational and cultural experiences offered by museums. That is, the museum's educational activities, exhibition contents and narrative services have been

recognized by the public.

5.3. Explanation, cultural creation and ticket reservation requirements

The high public demand for docents and guides indicates that museums have room for improvement in providing interpretive and educational services. Cultural and creative products in museums have also been highly evaluated, which reflects the current phenomenon of museum craze and cultural and creative craze, and provides opportunities for the development of cultural derivatives of museums. However, the difficulty of booking tickets and grabbing tickets are frequently mentioned in the comments. The phenomenon of hard to get a ticket will not only affect the expectation of the successful public who do not make reservations for the museum, but also lead to the disturbance of the perceptual experience environment caused by crowded visitors.

In the future, the museum can further strengthen its educational elements and launch more exhibitions and activities with cultural value to meet the needs of the public. Investment in digitalized museum products such as virtual reality displays, interactive exhibits, and online educational resources should also be strengthened to meet emerging needs.

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