



A Comparative Study on Post-occupancy Evaluation of University History Museums in Xi'an Universities

--The History Museums of Northwestern Polytechnic University and Xi'an Jiaotong University as Examples

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Abstract. In this paper, two representative university history museums in Xi'an, Northwestern Polytechnical University (hereinafter referred to as NPU) and Xi'an Jiaotong University (hereinafter referred to as XJTU), are taken as the research objects, and the display environment of the two university history museums is deeply discussed, including the surrounding environment, exhibition layout, auxiliary facilities, physical environment and general conditions. All aspects are refined and divided into three levels of evaluation index factors, and the post-occupancy evaluation system of display environment is established. The corresponding satisfaction questionnaire was conducted for each index factor and the corresponding satisfaction score was obtained. After that, according to the weights of different index factors given by experts in related fields, the total satisfaction score of the school history museum of the two universities is calculated, and the similarities and differences of the satisfaction of each evaluation factor are compared and analyzed according to the satisfaction scoring standard table, and the advantages and disadvantages of the display effect of the school history museum of the two universities are summarized, such as the surrounding environment and learning atmosphere of the school history Museum of NPU. Visit streamline organization, artificial lighting, sanitation and other aspects have more advantages, XJTU in the identification and accessibility, display means of richness, display atmosphere and interactive experience to do better. At the same time, the two schools also have shortcomings in the setting of public rest space and the consideration and utilization of natural physical environment. Finally, according to the conclusion, the corresponding optimization strategies and methods are proposed to further improve the display effect.

Keywords: School History Museum, post-occupancy evaluation, comparative analysis

1 Introduction

1.1 Research background and status quo

University history Hall plays a vital role in recording, displaying and inheriting the achievements of university construction and development. As a centralized display platform for the fine traditions and cultural essence of the university, the college history Hall not only plays a role in the display and publicity of all walks of life, but also plays a role in gathering the hearts of teachers and students, cultivating their sentiments and guiding their values.

In recent years, many colleges and universities in Xi 'an have set up school history museums reflecting their campus cultural characteristics. These school history museums have their own characteristics in building site selection, exhibition environment and exhibition mean. However, at present, attention to the display effect and satisfaction feedback after the completion of the school history museum is low, and there is a lack of systematic and comprehensive investigation and research in related fields.

1.2 The purpose and significance of the study

In order to explore the display effect of these school history museums and the satisfaction feedback after use, this paper chooses the school history halls of NPU and XJTU, two representative universities in Xi 'an, as the research objects.

Through the evaluation and comparative analysis of the two university history museums, we will find their respective display advantages and disadvantages.^[1] These findings will help us better understand how to improve and enhance display environments to create more engaging and effective exhibitions that convey historical information. We will propose a series of improvement directions, including optimizing display layout, adding interactive elements, improving display means, etc.^[2], in order to improve the satisfaction of teachers and students and further enhance the display effect.

The research results of this paper will provide valuable reference for the improvement and development of the school history museum in Xi 'an area. At the same time, these research results will also provide inspiration and reference for the improvement of other similar exhibition venues, and promote the development and progress of the whole industry.

2 Research methodology and content

2.1 Establishing the Indicator System and Indicator Weights

In this paper, by reviewing relevant literature and consulting with architecture teachers and first-class registered architects, the "Index System of Factors Influencing Satisfaction in the Use of University History Museums"^[3] (hereinafter referred to as the index system, as shown in Table 1) was established with 5 secondary and 21 tertiary index factors.

Table 1. The index system of influencing factors of satisfaction is used in the college history museum

Primary indicator factors	Secondary indicator factors	Tertiary index factors
School history museum	A External surroundings of the school history Museum	A1 Natural surroundings
		A2 Surrounding cultural atmosphere
		A3 Architectural features of the School History Museum (sense of time or era)
		A4 Convenient transportation to the school history Museum
		A5 Signage leading to the school history Museum
	B School history museum interior display layout	B1 Organization of visitor flow
		B2 Display content (reasonable and sufficient)
		B3 Traditional display methods (varied and abundant)
		B4 Digital display
		B5 Display atmosphere
		B6 Interactive experience
	C Internal auxiliary facilities of school history Museum	C1 easy to find transport spaces such as lifts
		C2 The location of public toilets
		C3 Rest seat
	D Internal physical environment of school history Museum	D1 Natural lighting
		D2 Artificial lighting
		D3 Sound effect
		D4 Temperature and ventilation effect
	E General condition of the school history museum	E1 Management service
		E2 Sanitary and clean
		E3 General display atmosphere

On this basis, the author invited three architecture professionals (one professor of architecture and two first-class registered architects) to assess the importance of the evaluation factors at each level and the weighting of their influence on the magnitude of the evaluation factors at the previous level, and obtained a weighting table for the factors of the primary indicators (as shown in Table 2), a weighting table for the factors of the secondary indicators (as shown in Table 3), and a weighting table for the factors of the tertiary A, B, C, D and E categories (as shown in Tables 4, 5, 6, 7 and 8 respectively).^[4]

Table 2. Factor weight table of primary indicator factors

Primary indicator factors	Weight
School history museum	100%

Table 3. Factor weight table of secondary indicator factors

Secondary indicator factors	Weight
A External surroundings of the school history Museum	15%
B School history museum interior display layout	40%
C Internal auxiliary facilities of school history Museum	10%
D Internal physical environment of school history Museum	20%
E General condition of the school history museum	15%

Table 4. Class A weight table of tertiary index factors

Tertiary index factors Class A	Weight
A1 Natural surroundings	10%
A2 Surrounding cultural atmosphere	20%
A3 Architectural features of the School History Museum (sense of time or era)	10%
A4 Convenient transportation to the school history Museum	30%
A5 Signage leading to the school history Museum	30%

Table 5. Class B weight table of tertiary index factors

Tertiary index factors Class B	Weight
B1 Organization of visitor flow (clear and reasonable)	30%
B2 Display content (reasonable and sufficient)	15%
B3 Traditional display methods (varied and abundant)	10%
B4 Digital display	10%
B5 Display atmosphere	15%
B6 Interactive experience	20%

Table 6. Class C weight table of tertiary index factors

Tertiary index factors Class C	Weight
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C1 easy to find transport spaces such as lifts	40%
C2 The location of public toilets	30%
C3 Rest seat	30%

Table 7. Class D weight table of tertiary index factors

Tertiary index factors Class D	Weight
D1 Natural lighting	10%
D2 Artificial lighting	40%
D3 Sound effect	20%
D4 Temperature and ventilation effect	30%

Table 8. Class E weight table of tertiary index factors

Tertiary index factors Class E	Weight
E1 Management service	40%
E2 Sanitary and clean	30%
E3 General display atmosphere	30%

2.2 Questionnaire Design

Descriptive statistics and quantitative analysis of the questionnaire results were carried out using excel to classify the satisfaction of each evaluation factor into five evaluation levels ^[5]: very satisfied, more satisfied, average, less satisfied and dissatisfied, and to assign each level to a score range of 4-5, 3-4, 2-3, 1-2 and 0-1 respectively (as shown in Table 9). The influence of different factors on satisfaction is explored through the differences in scores.

Table 9. Satisfaction rating scale

Satisfaction score A	Comment
$0 < A \leq 1$	Not satisfied
$1 < A \leq 2$	Less satisfied
$2 < A \leq 3$	More generally
$3 < A \leq 4$	Satisfied
$A > 4$	Very satisfied

2.3 Interviewees

The author selected 100 teachers and students in each of the two schools to conduct a post-occupancy evaluation questionnaire, ^[6] and received 100 valid questionnaires in both schools, with an effective rate of 100%. Respondents in both schools included 10 teachers and 90 students. ^[7]

Among the respondents from NPU, 54% and 46% were male and female respectively, while among the respondents from XJTU, 52% and 48% were male and female respectively, this is in line with the predominance of science and technology majors in both universities.

3 Data analysis

The average score of each tertiary indicator factor was calculated based on the scores of each question in the questionnaire, and then the scores of each secondary indicator factor were calculated by combining the weighting tables corresponding to each type of factor, and then the satisfaction scores after the comprehensive use of the school history museums of the two schools were calculated by the same calculation method.^[8]

3.1 Primary Indicator Factors

The total score of the university history museum, i.e., the primary indicator factor (as shown in Figure 1), is 3.594 for the Northwestern Polytechnical University's university history museum (hereinafter referred to as NPU-HM) and 3.891 for the Xi'an Jiaotong University's university history museum (hereinafter referred to as XJTU-HM). The satisfaction rating of the two universities is relatively satisfactory, with XJTU slightly higher than NPU.

3.2 Secondary Indicator Factors

At the level of secondary index factors (as shown in Figure 2), both schools score at or above 3, which means they are satisfied or very satisfied. Among them, NPU-HM scored 3.823, 3.742, 3.747, 3.182 and 3.418 respectively in five aspects of the secondary index A, B, C, D and E, and the satisfaction evaluation was satisfactory. XJTU-HM scored 4.014, 3.912, 3.950, 3.437 and 4.278 in the five aspects of A, B, C, D and E, respectively. The satisfaction evaluation of A and E was very satisfactory, and the rest was relatively satisfactory. In summary, the satisfaction scores of secondary index factors of XJTU-HM are higher than those of NPU-HM, among which the scores of A-D are slightly higher, and the score of E satisfaction scores of XJTU-HM is significantly higher than that of NPU-HM.

3.3 Tertiary Indicator Factors

At the level of three-level index factors (as shown in Figure 3), the two universities have different levels. NPU-HM scores higher in "surrounding natural environment", "visiting circulation organization", "easy to find traffic space such as building elevators", "artificial lighting", and "sanitation", while XJTU-HM scores higher in other items. In general, the scores of most index factors are similar between the two universities. Only in "convenient transportation to the history Museum", "exhibition atmos-

phere", "rest seats", "acoustics" and "management services", XJTU-HM is significantly higher than NPU-HM. However, in terms of "natural lighting", "sound effect", "temperature and ventilation effect", the two schools scored low and the satisfaction evaluation was mostly less satisfactory or more generally.

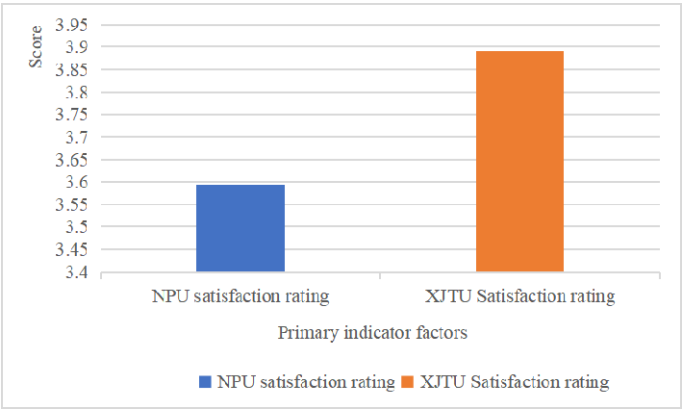


Fig. 1. Comparison of satisfaction scores of primary index factors

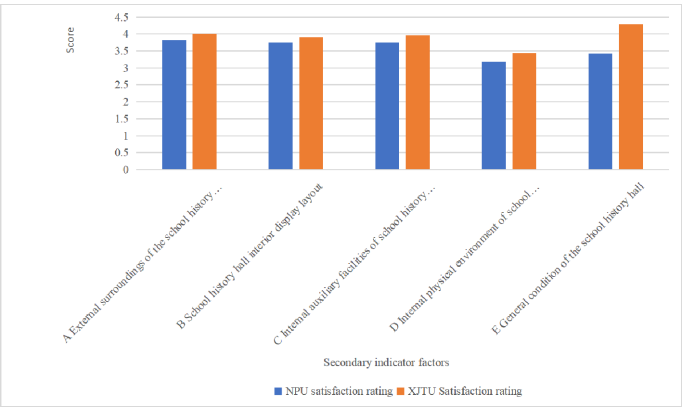


Fig. 2. Comparison of satisfaction scores of secondary index factors

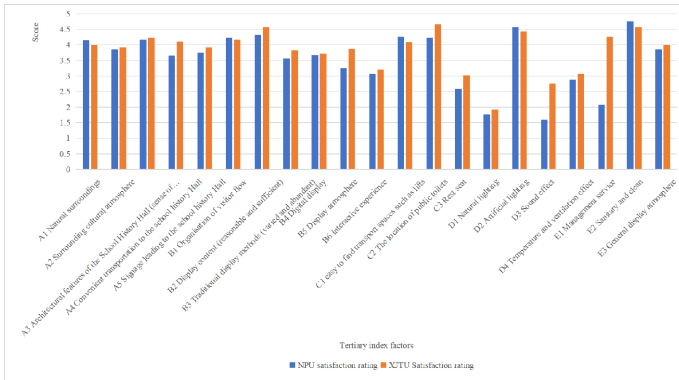


Fig. 3. Comparison of satisfaction scores of tertiary index factors

4 Summary and recommendations

4.1 Summaries

In general, teachers and students of the two schools have high satisfaction with the post-occupancy evaluation of their school history museums. The specific advantages and disadvantages of various aspects are summarized as follows: [9]

4.2 External Surroundings of the School History Museum:

NPU-HM is located in the water library building in the core area of the school, near the lake, with high green coverage and a strong learning atmosphere. XJTU-HM is located in the southern part of the campus, near the south gate and its student activity Center. It is an independent building with beautiful design. By contrast, NPU-HM has a more beautiful surrounding environment and a stronger cultural flavor, while XJTU-HM is more iconic and easier to reach. Due to the greater weight of accessibility and identification, the XJTU satisfaction score is higher in this aspect.

4.3 School History Museum Interior Display Layout:

The scores of the two schools are close. However, XJTU scored relatively high in display atmosphere and interactive experience. The reason is that XJTU has added a number of interactive nodes in the display process, and the forms are relatively diverse, including sand table, interactive map, historical train, audio video, red class, end-of-visit message board, etc.

4.4 Internal Auxiliary Facilities of School History Museum:

The main auxiliary facilities in the history libraries of the two schools are complete and accessible, but there is no obvious resting space in the history libraries of the two

schools. The visiting circulation of XJTU is long, so it is more necessary to set up proper seating.

4.5 Internal Physical Environment of School History Museum:

The two schools are similar, and the overall satisfaction score is lower than other secondary index factors. The main reason lies in the imbalance between the construction of natural physical environment and artificial physical environment. The history museum of the two universities does not make full use of natural physical environment, lack of natural lighting, poor natural ventilation effect, and insufficient design of sound environment.

4.6 General Condition of the School History Museum:

History museums of the two schools have their own advantages and disadvantages. NPU-HM is small in scale and located in the main building, so it has a higher degree of satisfaction in hygiene. In terms of management services, the satisfaction of Western University of Technology is low, mainly because its openness is lower than that of XJTU-HM, the reservation information feedback time is longer, and the guide explanation system needs to be improved.

4.7 Conclusions

Through comprehensive comparative analysis, NPU-HM and XJTU-HM has its own advantages and disadvantages.

In terms of advantages, NPU-HM has a more beautiful surrounding environment, a stronger learning atmosphere, a clearer organization of visiting routes, and better artificial lighting and sanitation. XJTU-HM, on the other hand, is more identifiable and accessible, with rich display means, better display atmosphere and interactive experience.

In terms of disadvantages, the two schools are much the same. In terms of the setting of public rest space and the consideration and utilization of natural physical environment, both need to be improved. In general, these comparative analyses provide valuable reference and basis for the improvement and development of university history hall in the future.

4.8 Promotion Suggestion

External Surroundings of the School History Museum.

NPU-HM needs to add external identification and identifiable lines to attract traffic. XJTU can combine with the South Gate Square to increase the greening rate around the school history Museum and beautify the surrounding environment.

School History Museum Interior Display Layout.

The history museum of the two schools needs to improve the richness of the exhibition space, break the traditional display mode of one-way output, and increase scientific and technological elements and interactive experience to make the exhibition more interesting.

Internal Auxiliary Facilities of School History Museum.

Appropriately increase the rest space to improve the space experience of visitors.

Internal Physical Environment of School History Museum.

Increase natural lighting and ventilation, pay attention to the design of sound environment, increase background music, etc.

General Condition of the School History Museum.

NPU should optimize the management service mode, increase the opening hours of the school history library, timely feedback information, etc. XJTU should increase the frequency of cleaning and reduce clutter of irrelevant items or temporary display boards.

5 Epilogue

By establishing the factor table of grading index and combining with the satisfaction evaluation system,^[10] this paper makes a detailed satisfaction evaluation on the whole and all aspects of the school history museum of Northwestern Polytechnical University and Xi 'an Jiaotong University. The quantitative data and charts can intuitively understand the differences and similarities in the satisfaction of all aspects of the school history museum of the two universities and the causes of the similarities and differences, so as to put forward more targeted suggestions for improvement. However, the satisfaction evaluation system has some limitations, and it should be the unremitting pursuit of university history museum to explore a more scientific, more real and more objective evaluation system based on the satisfaction evaluation system.

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