Research on Intelligent Interactive Experience Design of Museum Based on Service Design Thinking

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Abstract—Under the background of promoting intelligent design to digital today, designers improve the interaction of science and technology in museums through the computer interface design and evaluation methods in service design, so that the user experience is closer to service design. Through this analysis of the survey data, this paper finds that after the new digital interaction channel combines service and experience, the service design and user experience will produce similar conceptual boundaries and conflicting differences, which are easy to be confused. The research results of this paper demonstrate that service design has a wide range of applications in museum intelligence technology and digital systems. Service design can promote sustainable development and design renewal of museums.

Keywords: service design, user experience design, museum design, mental journey map, Digital design

1 INTRODUCTION

Based on the current museum of intelligent digital innovation design leading exhibition environment technology, under the development background of the museum to multitouch design of user experience, user journey map and iterative prototype as the design goal, highlight the service design centered design concept, grasp the comprehensive control of cultural relics display and environment atmosphere innovation, is the key direction of the design goal. At the same time, its concept comes from the user experience and service design under the human-computer interaction discipline. On the one hand, in service design [1], digital interaction is mainly used in delivery channels, which makes service design drive the transformation of user experience. On the other hand, with the rapid development of the Internet, service design has been transformed into products. Therefore, focusing on the user's journey in museum design and approaching the user experience to the direction of service design [2] are the key to the research objectives of this paper.

Referring to the results of the International HCI and CHI conferences on service design [3], there are few international research on service design and user experience [4]. Museum service design applied to the advantage of user experience is that it can determine for each contact learning from each other, through the computer technology will be the viewer touch connection, and improve the opportunity of practice theme on multiple dimensions, which at the same time more can promote the improvement of interaction between contact intelligent enterprises, so achieve intelligent design in the field of museum, Finally, the comprehensive adaptation of the new field of innovation.

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2 OVERVIEW OF RELATED CONCEPTS

This paper mainly studies how to understand the practical difference between the user experience of museum intelligent interaction and the sustainable development of service design. Based on the research of human-computer interaction design on practitioners' use and innovation process, this paper puts forward a new theme of interaction between museum wisdom and practice, and understands the differences between service design and user experience from a systematic perspective. The emergence of sustainable development in 1980s coincided with the progress of communication technology, which helped to promote the transformation from products to services [5]. Human-computer interaction appeared in the demand of users for the development of computer technology interfaces, and continued to pay attention to three key points. First, service contact: users' participatory contact in museums; Second, create value together: museums create opportunities for users, and how services create value for users in the process of contact interaction; Third, social material: the dynamics of people, places and things in operation are the necessary existence in service [6]. Similarly, user experience also focuses on analyzing users' needs and ideas, taking digital interface interaction as the breakthrough point, breaking physical contacts, and meeting the prototype of interactive design between space and users' wisdom.

The difference between designing things for people and designing things for people is the difference between service design and all different forms of design [7]. The innovation of digital display, holographic images and smart terminals also reflect the value of museums. The specific aspects are as follows: First, the trend view for more users' interests; Second, the product application system architecture supporting performance and things; Third, service design and user experience pay more attention to the concept of creating value with users [8]. The design method of intelligent experience program and visual customization under the service thinking explores the potential new service mode in the space environment and physical experience, and realizes the rapid iteration and maximum benefit of service design in the field of smart museums.

3 USER EXPERIENCE RESEARCH METHOD

This paper takes Liaoning Provincial Museum of China as an example, and adopts a non-probabilistic and voluntary online survey questionnaire [9]. Conduct research with open questions and ratings, and summarize qualitative and quantitative data according to the results.

The following statements are only to answer the questions in the questionnaire. Question 1: What is the scope of service design in the museum's intelligent interaction? Question: 2: What is the scope of user experience design? Question 3: User experience is a part of service design. Is it convenient to design? Question 4: Is it convenient to combine user experience design and service design methods with the intelligent interactive design of museums? Question 5: Should more methods of user experience design be applied in service design? Question 6: Should more methods of service design be applied in user experience design? In this paper, a total of 200 results were collected through questionnaires, of which descriptive and systematic statistics were used to analyze quantitative data, and inductive problem analysis was used to analyze qualitative data [10].

Qualitative statistics begins with the discussion of Author A through the open subset of interactive codes, and the information of each answer will be highlighted, so that each answer can produce several interactive codes and comments. In the same discussion, the author a/b/c identified and analyzed a group of 124 public codes, and abstractly classified them to produce 20 final codes. After discussion, four dimensions were determined to describe the relationship between the 20 codes and user experience and service design. At the end of the discussion, the code is used to analyze the rest of the data. Similarly, the three authors of a/b/c analyze different problems again, and test the accuracy among the authors with 20% of the data, so as to describe the analysis code and update the statistics above 0.6. The final qualitative data set includes 1039 related research comments.

4 ANALYSIS OF INVESTIGATION RESULTS

Based on Norma's book "Emotional Design", the needs of the instinctive, behavioral and reflective layers of the viewer's experience [11], and combined with the methods of primaiy, secondaiy and tertiaiy in the radar marking method (Fig 1), the quantitative data of the survey results are counted.

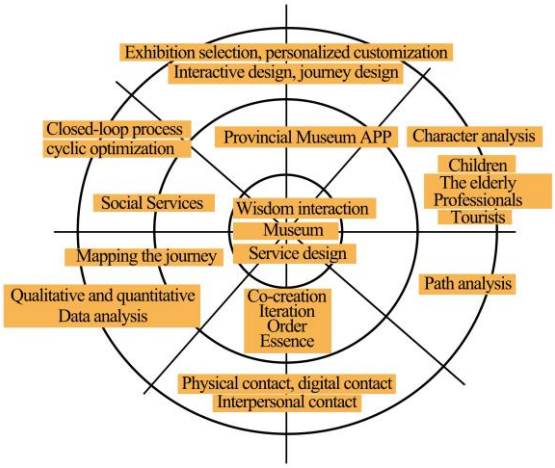
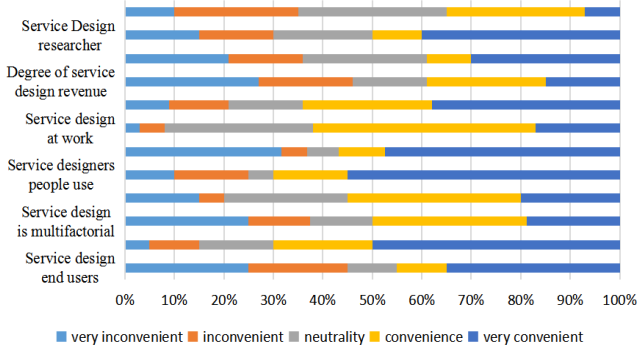


Figure 1. Radar notation

4.1 Service Design and User Experience Reach areas: Q1 and Q2

According to Q1 and Q2 questions, Respondents think that the starting point of user experience and service design in the interaction of manufacturing users of science and technology in the museum's intelligent interaction is the same,but the tasks are different. (Table 1). *Damschroder's* implementation framework, as a practical method to study people-centeredness, delivers experience to users by renewing the service thinking between people and things [12].

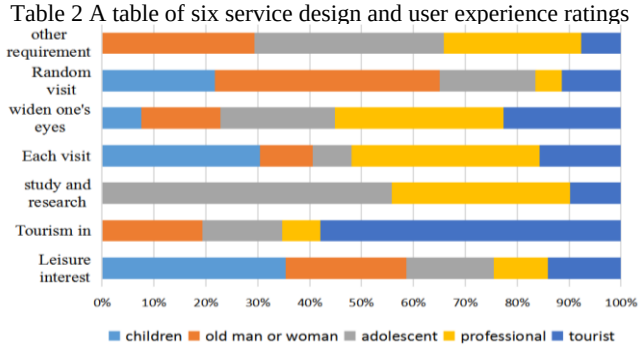
Table 1 Descriptive statistics of ratings for six services in terms of design and user experience



4.2 Service Design and user experience touchpoints and theories: Q3 and Q4

According to Q3 and Q4, The convenience of service design terminals accounts for 10%, and the convenience of user experience terminals accounts for 50%. Second, the number of multi-factor votes of its digital contacts for the APP client is equal; The influence of the three interpersonal contacts, that is, the explanation audio, on users is reflected in the fact that the service and experience are displayed conveniently, accounting for 55% and 45% respectively (Table 2).

Table 2 A table of six service design and user experience ratings



4.3 Service design and user experience model building: Q5 and Q6

According to Q5 and Q6 questions, *Joseph Novak* developed the concept of user model as a method to study user experience and service design. It is necessary to analyze the users of the exhibition (Table 3) Analyze the four types of users: children, the elderly, professionals and tourists, and list the exhibition levels of leisure interest, travel and sojourn, study and research, individual visit, over-wide vision, random visit and other needs (Table 5).

Table 3 A table of six service design and user experience ratings

Survey Question series	**User experience Rating**				
	very inconvenient	***inconvenient***	***neutrality***	***convenience***	***very convenient***
Service design end users	25%	20%	10%	10%	35%

User Experience End users	5%	10%	15%	20%	50%
Service design is multifactorial	20%	10%	10%	25%	15%
User experience has many factors	15%	5%	25%	35%	20%
Service designers people use	10%	15%	5%	15%	55%
User experience people use	30%	5%	6%	9%	45%
Service design at work	3%	5%	30%	45%	17%
User experience at work	9%	12%	15%	26%	38%
Degree of service design revenue	27%	19%	15%	24%	15%
Degree of user experience revenue	21%	15%	25%	9%	30%
Service Designresearcher	15%	15%	20%	10%	40%
User experienceresearcher	10%	25%	30%	28%	7%

Table 4 The number of comments in D1-D4 with four dimensional features and 20 interaction codes

serial number	**Four dimensional features and 20 interactive codes and comments**			
	Characteristic(D):Interaction(C)	***Comments***	***Characteristic:Interaction (continue)***	***Comments***
1	D1/C1: Income is a secondary concern	32	D3/C11: Organizational constraints	36
2	D1/C2: Experience is the main design goal	44	D1/C12: Business income model	34
3	D1/C3: Profit guides design orientation	48	D1/C13: Business strategic objectives	32
4	D3/C4: Develop as a separate intellectual field	60	D4/C14: Technology divides interaction systems	32
5	D4/C5: Implement in the museum system	63	D2/C15: User experience interface level	30
6	D4/C6: The ability to interact in a specific domain	67	D3/C16: Contains the scope	32
7	D1/C7: For the viewer user	73	D2/C17: Product grade	27
8	D4/C8: Overlapping and coexistingdevelopment	86	D2/C18: Contact Point Management	26
9	D4/C9: Not limited to the museum system	97	D2/C19: Digital systems technology interaction	25
10	D2/C10: Wisdom is richer than routinization	175	D2/C20: Leapfrog contact linkage	20

Table 5 Data sheet of visitor information statistics of museum

Age	**User visit needs**						
	Leisure interest	***Tourism in***	***Study and research***	***Each visit***	***widen one's eyes***	***Random visit***	***other requirement***
children	50%	0%	0%	30%	5%	15%	0%
old man or woman	33%	12%	0%	10%	10%	30%	5%
adolescent	23.9%	9.5%	25.8%	7.3%	14.5%	12.8%	6.2%
professional	14.6%	4.5%	15.9%	35.7%	21.3%	3.5%	4.5%
tourist	20%	35.9%	4.5%	15.5%	14.9%	7.9%	1.3%

4.4 Qualitative survey results

The investigation produced 20 interactive codes, and four dimensional features for statistics (Table 4). D1 smart technology and contact system, D2 design guidance and interface system, D3 innovative thinking and actual situation, and D4 museum system deepening and adaptation. To understand the museum's current views on the interaction between service design and user experience. The following figure describes the relationships between the 20 interactive codes, four-dimensional features, and 6 motifs (Fig3).

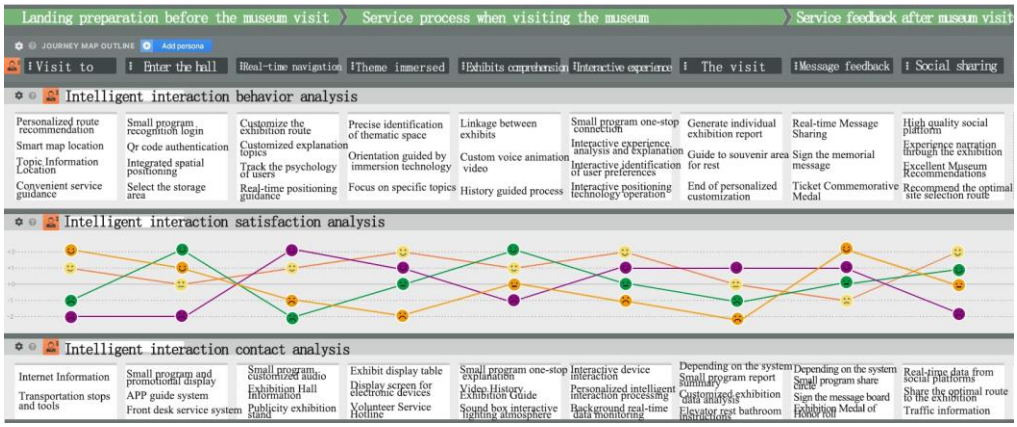


Figure 2. Analysis of the journey map of participating users

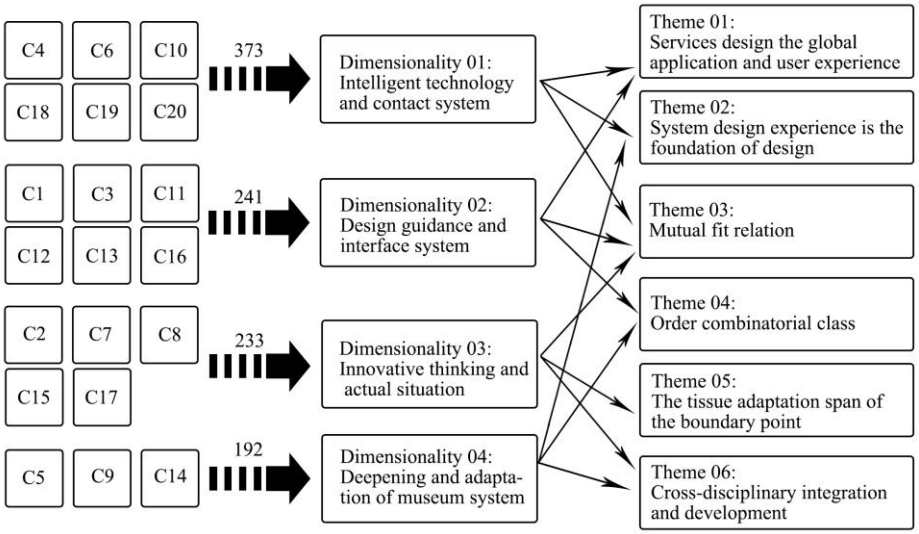


Figure 3. Interactive coding with dimensions and themes with comments

5 SUSTAINABLE CONSTRUCTION STRATEGY OF SERVICE

5.1 Technology sustainability analysis

The "journey mapping" unit of the intelligent interactive technology of Liaoning Provincial Museum uses Smaply software to analyze data, of users in the development process. The core quantitative research data can come from the exhibition indicators, objectives, preferences and satisfaction, and be applied to maps through concepts and ideas to establish a closer relationship with users. experience, and make service empathy achieve more standard, efficient and creative under the interdisciplinary process (Fig 2).

5.2 Collaborative and interactive strategies before, during and after the exhibition

Implement Nina Simon's detailed analysis of constructing a new service participation process model in the research of "Participatory Museum" [13]. First, children's route, arousing children's interest in the exhibition hall through movable contacts, and then designing human-computer interaction devices and visual touch depiction devices [8]. Second, the elderly line, through the safe and convenient contacts, accurately locates the activities of the elderly. Re-design shared contacts, enlarge, speak and rest, and drive the feelings of the elderly to participate in the exhibition. Third, professional lines, record special research and lectures, and then use cultural and creative display design contacts to drive sustainable value creation. Fourthly, the tourist route, through characteristic perception, intelligent interaction and resource sharing, can enhance tourists' recognition of the exhibition hall, and then create service and rest contacts to enhance tourists' sensory needs and emotional sublimation (Fig 4).

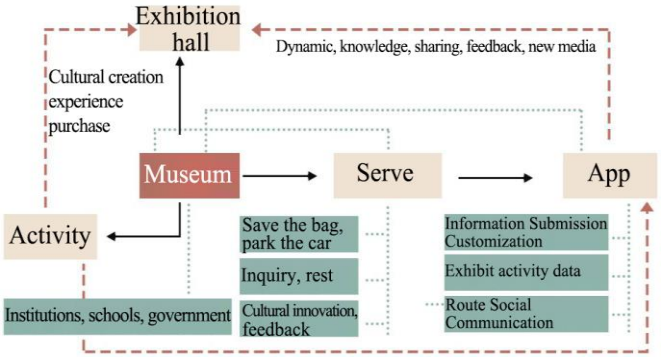


Figure 4. Internal route system service analysis of participating use

6 CONCLUSION

First of all, on the road of promoting the intelligent design of museums, the focus of this paper is to combine service design with user experience design, so as to improve the perception of audiences and users. The specific way is to develop from digitization and networking to

intelligence. Secondly, the service design emphasizes the importance of work by investigating the needs of users and optimizing the three intelligent technologies of "physical contact, digital contact and interpersonal contact", so as to improve the practical strategy of the museum's smart interactive technology. Last point, in the current Internet era, museums in the immersive experience mode will eventually use new smart technology applications and digital online museum innovations to promote the adjustment and upgrade of the smart chain structure at the technological level. Therefore, this is a process that needs to improve the practice of technology adaptation, and it can continue to be studied in the future, while driving the sustainable stability of regional economic recovery and prosperity.

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