



A Study on the Effect of Immersion Experience on the Communication Effect of Intangible Heritage Culture: A Case Study of Nanjing Yunjin Museum

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Abstract. In order to promote the integration of cultural tourism and improve the effect of museum tourism products on the dissemination of intangible heritage culture, this paper conducted a survey and research using Nanjing Yunjin Museum as a case study. After collecting data through questionnaires, SPSS 23.0 was used for correlation analyses and multiple linear regression analysis to confirm that there is a significant positive relationship between the immersion experience effect brought by museum exhibitions to tourists and their intangible heritage culture dissemination effect, and a regression model formula between them was established. Accordingly, it was concluded that targeted improvement of visitors' immersion experience in various aspects could help promote the effect of museums' non-heritage culture dissemination.

Keywords: Immersion experience · intangible heritage cultural communication · Cloud brocade · Nanjing Cloud Brocade Museum

1 Introduction

Under a favorable technological and policy environment, tourism development is gradually shifting from plane sightseeing to participatory experiences, and immersion theory has been applied in various aspects of industry innovation. The immersion experience promotes deeper interaction between tourists and tourism cultural devices, and strengthens tourists' sense of cultural identity from both cognitive and emotional aspects (Fu, 2020), and the living communication is also conducive to the preservation and transmission of handicraft-based intangible heritage (Lv, 2019)³. And combining Chinese style with interaction designs in the museum exhibitions is beneficial to fully activate intangible heritage culture to attract a wider audience, integrate into daily life, and strengthen the unconscious communication of user experience (Wang, 2016), thus contributing to the dissemination of intangible heritage culture.

Therefore, it is essential to study how the immersion experience has an impact on the communication of intangible heritage culture, so that the immersion experience can be

purposefully enhanced to further boost the effectiveness of intangible heritage culture communication in museums.

2 Research Design and Questionnaire Research

The immersion experience, also be referred to as the mind-flow experience. In order to obtain an immersion experience, six conditions have to be satisfied, namely: firstly, the unity of knowledge and action; secondly, complete concentration without distractions; thirdly, “immersion”, i.e., blurring of self-awareness; fourthly, grasping the whole activity; fifthly, the activity should be motivating; and sixth, the activity should have a clear goal. Immersive experiences focus on sensory experiences and interactive experiences. The immersive and living exhibition of Nanjing Yunjin Museum is mainly reflected in three aspects, which are experience space design, interaction design, sensory and emotional design and the design of cultural and creative derivate.

The presentation of the communication effect is progressively deepened according to a certain logic. Firstly, on the cognitive level, secondly, on the attitude level; and finally, on the action level. It is that the acquisition of external information causes a certain degree of a tendency to more consistent changes in the structure of cognition and knowledge reserves, values or emotions, as well as speech and acts [1].

Therefore, the intangible heritage culture communication effect defined in this study means that the exhibition of Nanjing Yunjin Museum makes visitors understand the culture and craftsmanship of Nanjing Yunjin, etc., generate the emotion of love and identification with it, and are willing to spontaneously spread or inherit the culture of Yunjin.

Based on the above theory, the questionnaires were designed in conjunction with previous measurements of immersion experience and cultural communication effects by scholars such as Xiao-Ning Wang (2019) and Yachi Liu (2021), respectively. Mainly including three parts, one is a survey on the demographic characteristics and the revisit rate of Nanjing Yunjin Museum visitors, covering gender, age, education, place of origin and number of revisits; one is a survey on the immersion experience of the Nanjing Yunjin Museum, using a five-point Likert scale that includes measures of concentration, self-awareness, expectation balance, self-awareness input, sense of control, sense of time distortion and intrinsic motivation to view the exhibition; a third measure of the effectiveness of intangible heritage cultural communication is a dichotomous scale that includes three dimensions: cognitive aspect, affective aspect, and action aspect.

The survey was conducted from March 23rd to 28th, 2022, and the questionnaires were collected online and distributed on the main social media platforms such as WeChat, QQ, Weibo and Little Red Book. A total of 107 questionnaires were collected. Excluding 6 questionnaires that had not been to Nanjing Yunjin Museum and incomplete answers, there were 101 valid questionnaires collected, with a valid rate of about 94.39%. The sample is as follows:

Table 1. Basic information of survey visitor

Title	Options	Frequency	Percentage (%)	Cumulative Percent (%)
Q1-Your gender is?	Female	72	71.287	71.287
	male	29	28.713	100
Q2-Your age is?	old	54	53.465	53.465
	18 ~ 24 years old	26	25.743	79.208
	31 ~ 50 years old	14	13.861	93.069
	51 years old and above	4	3.96	97.03
	25 ~ 30 years old	3	2.97	100
Q3- Your education level is?	High school or junior college	57	56.436	56.436
	College and Bachelor	35	34.653	91.089
	Master, PhD and above	6	5.941	97.03
	Junior high school and below	3	2.97	100
Q4- Are you local citizen?	Yes	83	82.178	82.178
	No	18	17.822	100
Did you visit Nanjing Yunjin museum before?	First time	82	81.188	81.188
	Twice and above	19	18.812	100
Total		101	100	100

3 Analysis of Research Results

3.1 Reliability and Validity Analysis

In assessing the accuracy and validity of the questionnaire test results, reliability and validity analyses were carried out for the immersion experience scale and the intangible heritage cultural communication effect survey scale. Cronbach's alpha was used as the reliability evaluation criterion, and KMO test, Bartlett's test and variance interpretation were used as validity evaluation criteria. The Cronbach's α value of the immersion experience scale was calculated by SPSS23.0 as 0.986, and the Cronbach's α value of the calibrated intangible heritage cultural communication effect scale was 0.932, both of which were greater than 0.9 with excellent reliability. The results of the KMO test for the two scales were 0.945 and 0.745, respectively, and the results of the Bartlett's spherical test showed a significant p-value of 0.000***, which showed a level of significance and a remarkable correlation among the variables, and the factor analysis was valid.

Table 2. Description statistics of immersion experience

Description Statistics					
	Case Number	value	Maximum value	Average value	Standard deviation
Cognitive dimension	101	0.00	3.00	2.8515	.57247
Emotional dimension	101	0.00	4.00	3.8416	.67428
Action dimension	101	0.00	3.00	2.8119	.65898
Number of effective cases (in columns)	101				

In the variance explanation table, the number of principal components was 7 and 3, respectively, when the characteristic root of variable explanation was lower than 1. The contribution of variable explanation reached 0.957 and 0.82, respectively, which was consistent with the current question dimension design, and the explanatory validity of the questionnaire was high.

As such, the data collected by the questionnaire can be further analyzed.

3.2 Descriptive Statistical Analysis

The survey was conducted using a five-point Likert scale and a dichotomous scale to measure the effect of immersion experience and intangible heritage culture communication. According to the SPSS statistical data analysis, the average score of each dimension in the immersion experience measurement is greater than 80%, and the immersion experience is stronger. And the degree of influence on the three levels of cognition, emotion and action of the respondents is greater than 90%, indicating that the effect of intangible heritage culture communication is also exceedingly significant. Consequently, it can be assumed that visitors to the Nanjing Yunjin Museum have an immersive experience during the viewing process and have been subjected to the dissemination of intangible heritage culture.

3.3 Relevance Analysis

In considering whether there is any correlation between the feeling of immersion experience in the exhibition and the effect of intangible heritage culture dissemination and its intensity, this study used SPSS 23.0 software to analyze the correlation between the feeling of immersion experience and intangible heritage culture dissemination through Pearson correlation coefficient. At the significance level of 0.01, the significance p of immersion experience score and intangible heritage culture communication effect score

Table 3. Descriptive statistics on the effectiveness of intangible heritage culture communication

Description Statistics					
	Case Number	value	Maximum value	Average value	Standard deviation
total concentration	101	3.00	15.00	12.2079	2.85768
Conscious	101	3.00	15.00	12.7921	2.71041
Expectations	101	2.00	10.00	8.5248	1.79774
Loss of self	101	2.00	10.00	8.4455	1.80818
Sense of control	101	2.00	10.00	8.0297	1.94656
Sense of time distortion	101	2.00	10.00	8.2178	1.96267
Intrinsic motivation	101	2.00	10.00	8.4059	1.82306
Number of effective cases (in columns)	101				

Table 4. The overall correlation

		Immersive experience
Effectiveness of intangible cultural heritage communication	Pearson Correlation	.409**
	Significance (two-tailed)	.000
	Case Number	101

** . At the 0.01 level (two-tailed), the correlation is significant.

is 0.000 less than 0.01, and the correlation coefficient between the two is 0.409, indicating that there is a positive correlation between immersion experience and intangible heritage culture communication effect in general.

In the further analysis of the correlation between each dimension of immersion experience and intangible heritage culture communication effect, the correlation between each dimension is less than 0.05, which shows a significant correlation. Where self-conscious experience, desired feeling balance and loss of self-awareness were more strongly correlated with the cognitive dimension with correlations close to 0.4; loss of self-awareness and intrinsic motivation also correlated more strongly with the affective dimension at nearly 0.4. But the score of correlation among all dimensions of the immersion experience and the action level is close to 0.3, which is a more shallow correlatio.

Table 5. Correlation among dimensions

Correlation		total concentration	Conscious Experience	Expectations and feelings balance	Loss of self-awareness	sense of control	Sense of time distortion	Intrinsic motivation
Cognitive dimension	Pearson Correlation	.306*	.399*	.417*	.393**	.354*	.349*	.365**
	Significance (two-tailed)	.002	.000	.000	.000	.000	.000	.000
Emotional dimension	Pearson Correlation	.282**	.316**	.366**	.395**	.324**	.389**	.411**
	Significance (two-tailed)	.004	.001	.000	.000	.001	.000	.000
Action dimension	Pearson Correlation	.281**	.291*	.329**	.340*	.293*	.349**	.306*
	Significance (two-tailed)	.004	.003	.001	.001	.003	.000	.002

** . Atthe 0.01level(two-tailed),the correlation is significant

3.4 Regression Analysis

To further investigate the causal relationship between the perceived dimension of immersion experience and the communicative effect of intangible heritage culture, this study used the perceived dimension of immersion experience as the independent variable and the communicative effect of intangible heritage culture as the dependent variable, and conducted multiple linear regression analysis on the relevant variables using the input method.

After testing the regression model, the model R-squared value was received as 0.209, and the model passed the F-test ($F = 3.500, p < 0.05$), which means that the immersion experience perception dimension will have an impact on the communication of intangible heritage culture, and the model works, the immersion experience perception dimensions can explain 20.9% of the variation in the effect of intangible heritage culture. And the Durbin-Watson (D-W) value is close to 2, indicating that the model is not autocorrelated, there is no association between the sample data, and the model is relatively good. Yet, in the covariance test for the model, it was found that the VIF values of conscious experience, desired feeling balance, loss of self-awareness and intrinsic motivation dimensions in the model were > 10 , implying that there was a serious covariance problem between this dimension and the effect of intangible heritage culture communication, so the above four dimension items were treated as eliminated.

Combining the regression coefficient B values to compare and analyze the degree of influence of the independent variables on the dependent variables, it was observed that the sense of time distortion generated during the immersion experience had a positive effect on the effect of intangible heritage cultural communication, while the sense of

Table 6. Variable input form

Input/removed variables			
Model	Input variables	Removed variables	Method
1	total concentration Conscious Experience Expectations and feelings balance Loss of self-awareness Sense of control Sense of time distortion		Input

a. Dependent variable: the effect of intangible heritage culture

b. All the requested variables have been entered.

Table 7. Model test

Model Summary ⁵					
Model	R	R ²	Adjusted R ²	Error in standard estimation	Durbin-Watson
1	.4573	.209	.149	.57762	1.911
a. Predictor variable: (constant), total concentration					
b. Dependent variable: the effect of intangible heritage culture communication					

ANOVA ^a						
Model	Sum of squares	Degree of freedom	Mean Square	F		Significance
1	8.175	7	1.168	3.500		.002 ^b
Residuals	31.029	93	.334			
Total	39.204	100				
a. Dependent variable: the effect of intangible heritage culture communication						
b. Predictor variable: (constant), total concentration						

total concentration and control had a negative effect on the effect of intangible heritage cultural communication.

The equation of the regression model between the immersion experience and the effect of intangible heritage culture communication is thus obtained as:

The effect = 2.263–0.059* total concentration–0.074* sense of control + 0.183* sense of time distortion. (1).

Table 8. Basic information of the model

Factor ²		Unstandardized factor		Standardization factor	t	Significance	Covariance statistics	
Model		B	Standard Error	Beta			tolerances	VIF
1	(Constants)	.263	.290		7.816	.000		
	total concentration	.059	.156	.089	-.376	.708	.151	.612
	Conscious Experience	.289	.300	.417	-.963	.338	.045	1.991
	Expectations and feelings	.381	.295	.547	1.294	.199	.048	1.013
	Loss of self-awareness	.154	.233	.222	.661	.510	.075	3.290
	Sense of feeling	.074	.157	.115	-.471	.639	.144	.960
	Sense of time distortion	.183	.183	.287	1.003	.318	.104	.625
	Intrinsic motivation	.011	.229	.016	-.049	.961	.077	3.015

a. Dependent variable: the effect of intangible heritage culture communication

4 Research Conclusion

Based on the immersion theory, this study explores the advantages and shortcomings of its application in the museum exhibition to improve the communicative effect of intangible heritage culture, and enriches the research outcomes of the application of immersion theory in the museum exhibition and derivative products. And provide reasonable and effective suggestions for strengthening the cultural communication of Nanjing Yunjin in the museum exhibitions from various aspects, such as exhibition methods and product design.

Through the survey and study, we found that the Nanjing Yunjin Museum has made great progress in the living heritage and research in many aspects. Its diversified innovations in space, interaction and creative products effectively enhance the immersion experience of visitors to the exhibition and create a remarkable effect on the communication of intangible heritage culture. There is a noticeable correlation between the immersion generated by visitors during the viewing process of Nanjing Yunjin Museum and their acceptance of the exhibition’s intangible heritage culture communication effect, and giving visitors a pleasant immersion experience helps promote the exhibition’s intangible heritage culture communication effect. The effect of the exhibition on the communication of intangible heritage culture can be greatly influenced by the state of forgetfulness and dedication, while the effect of the exhibition on the communication of intangible

heritage culture can be reduced by the concentration of attention and the emphasis on the order and purpose of the exhibition.

As a result, the exhibition process should attract the attention of visitors as much as possible, while diluting the format of the educational purpose, in the participation of the eyes and ears to promote the knowledge of cloud brocade culture, to ensure that the museum publicity and education work interesting and abundant.

At last, the number of questionnaires collected in this study is not sufficient, and the time and place of questionnaire distribution should be selected scientifically and reasonably in the follow-up. In addition, due to time and capacity constraints, this study only explored whether there is an influence of immersion experience on the communication of intangible heritage culture, and further research can be conducted in the future on the relationship among the dimensions of both and their internal structures.

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