

Analysis on Tourist Experience Dimension and Its Impact of AR Tourism Project

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ABSTRACT

In the era of the integration of information technology and tourism, whether the experience brought by augmented reality (AR) tourism products can meet the needs of tourists has become the focus of the industry and academia. Taking the AR tourism project of 'Liang Shanbo and Zhu Yingtai' in Xiamen Fantawild Dreamland as an example, this paper extracted three dimensions of the impact of augmented reality technology on tourist experience: emotional experience, entertainment experience and aesthetic experience, by means of field investigation and questionnaire survey. At the same time, the influence of the three dimensions on tourist satisfaction and behavioral intention were further analyzed. Through regression analysis, it was concluded that the three dimensions have positive and significant impact on tourist satisfaction and behavioral intention. Finally, suggestions were put forward.

Keywords: *Augmented reality technology, Tourist experience, Empirical research.*

1. INTRODUCTION

The development of information technology and its application in the field of tourism have brought great changes to the tourism industry. One of the typical representatives is the application of augmented reality technology in the field of tourism and entertainment. This paper focuses on the impact of augmented reality technology on tourist experience, analyses the three dimensions of augmented reality technology on tourist experience and the effect on tourist satisfaction and tourist behavioral intention, so as to provide research reference for the development of augmented reality tourism products.

2. LITERATURE REVIEW

2.1. The Application Status of Augmented Reality Technology in Tourism Field

It mainly includes AR display research and cultural tourism applications. There are two categories of AR display research, one is the introduction and conquest of AR display technology. Most of the domestic and foreign researches focus on specific examples to study the technical difficulties of AR display. From the perspective of technical developers, aware of the importance of AR project experience, Nissin G. (2015)

proposed a new unmarked AR system based on the new algorithm, which overcame the limitations of the original marking system. This system enhanced tourists' experience in the real environment by adding animation, sound, music and other elements [1]. Shi Luyun (2018) superimposes virtual scenes and real postcards through augmented reality technology and unity3D platform, which reflects the local cultural characteristics in a digital way and promotes the interaction between tourists and scenic spots [2]. The other is theoretical research. Through the calculation of the relevant formula of the collected feedback data, the role of AR display in its research field was obtained, and the results are mostly positive [3]. The theoretical research on AR display in China mainly focused on the process description of AR display project combined with examples, as well as the research on AR related characteristics. AR display also was explained through multiple relevant AR display case analysis [4].

The research of augmented reality technology in cultural tourism is mainly reflected in the following aspects: the application of AR technology in digital protection of cultural tourism resources, the use of digital display of tourism products, the development and application of cultural tourism product system based on AR technology and the application value of AR technology in cultural tourism. For example, Yao Jingpin (2017) applied augmented reality technology to

the restoration of the Ming Palace Museum site in Nanjing. He believed that the role of augmented reality technology in cultural protection and site restoration would become a trend in the future^[5]. Wu Yiyun (2018) constructed a cultural tourism product system based on augmented reality technology^[6]. Zheng zhe ren et al. (2021) designed a traditional village cultural tourism digital product by augmented reality technology^[7].

2.2. The Influence Factors of Augmented Reality Technology on Tourists' Experience

There are different opinions on the influencing factors of AR technology in tourist experience in China with many different research perspectives. Li Zhi (2013) believed that augmented reality tourism products could provide tourists with better environmental perception and interactive activities, enabling tourists to gain experience in emotional, aesthetics, cognitive aspects^[8]. Zhou Bo et al. (2017) believed that the usefulness and convenience of AR technology for tourists would have an impact on tourists' attitude towards using AR technology, which would affect their willingness to use augmented reality tourism products, thus further stimulating tourists' tourism intention^[9]. Park and Stangl (2020) analyzed tourists' response to augmented reality application from the aspects of experience (ease of use, usefulness and fun), flow (control, attention and curiosity), perceived benefits (function, symbol and experience benefits), information quality, interactivity and attitude. They thought that personalized services should be developed to provide information and design for augmented reality system in order to make the augmented reality application match the different needs of the sensation seeker^[10].

Through the summary, it was found that scholars paid more attention to the effect of AR technology in the tourism field, develop new tourism products, and whether tourists were willing to accept and use AR tourism products. However, the research on tourist experience dimension and its impact of AR tourism project is still very limited.

3. RESEARCH DESIGN AND DATA COLLECTION

3.1. Case Introduction

Xiamen Fantawild Dreamland, located in Xiamen, is a comprehensive leisure tourist resort with theme music, performing arts and other supporting facilities. 'Liang Shanbo and Zhu Yingtai', which is the most popular and representative in the park, is the largest holographic AR theater performance project in the world. The project combines the augmented reality technology with the traditional Chinese cultural story 'Liang Shanbo and Zhu Yingtai'. With virtual pictures as the scene and real

people to show the plot content, the project brings the eternal love story to tourists in a new way, which is representative for analyzing the tourists' experience in augmented reality. In the questionnaire survey, the tourists' experiences and impressions on the AR performance project of 'Liang Shanbo and Zhu Yingtai' were investigated.

3.2. Questionnaire Design and Data Collection

Based on the relevant literature, this paper summarizes the three dimensions of the impact of augmented reality technology on tourist experience, including aesthetic experience, emotional experience and entertainment experience. According to the key points of Xiamen Fantawild Dreamland AR tourism products, this paper designs the items with the characteristics of augmented reality technology. Through pre-survey data processing, the final scale was formed after deleting inappropriate items (Table 1).

The main contents of the questionnaire are: basic information of tourists; Visitors' experiences and impressions of 'Liang Shanbo and Zhu Yingtai' in the Xiamen Fantawild Dreamland AR Technology Performance Project; Tourists' satisfaction with the AR tourism products of 'Liang Shanbo and Zhu Yingtai' and the overall satisfaction with Xiamen Fantawild Dreamland; Tourists' behavioral intentions, including revisit and recommendation intention. In March 2020, a total of 210 questionnaires were sent out online through the Questionnaire Star platform, among which 194 were valid, with an effective rate of 92.4%

Table 1. Augmented reality project experience scale

EMOTIONAL EXPERIENCE	AR shows enable you to better understand the development of the plot.
	AR shows are more interesting than ordinary shows
	Watching AR shows makes you more satisfied
	Watching AR shows is an unforgettable and precious experience
AESTHETIC EXPERIENCE	The scene of AR shows is vivid and intuitive
	AR shows are new ways of performance
	AR shows engage both the mind and the eye
ENTERTAINMENT EXPERIENCE	The environment in AR shows makes you feel comfortable
	The atmosphere of AR shows is just perfect, which makes you enjoy it
	The wearing facilities in AR shows make you very comfortable
	Watch AR shows, your mood can be relaxed

4. DATA ANALYSIS AND RESEARCH RESULTS

4.1. Sample Characteristics

Among the 194 tourists surveyed, 139 were female and 55 were male. 156 tourists aged 18-24, accounting for 80.4%, and 29 tourists aged 25-35, accounting for 14.9%. Among the tourists surveyed, only 3 are under the age of 18, 6 are aged 36-45, and there are no tourists over 46. Educational background distribution is relatively concentrated, mainly are university degree, a total of 165 people, accounting for nearly 90%. There are 5 tourists with graduate degree or above, accounting for 2.6%, and 5 tourists with high school degree or below. There are 19 tourists with junior college education, accounting for 9.8% of the total number. Students accounted for 74.2% of the total occupation, enterprises and public institutions accounted for 10.3%, freelancers accounted for 6.7%, individuals and civil servants accounted for 4.6% and 3.1% respectively, and there were 2 retirees. In terms of income distribution, tourists with a monthly income of less than 2,000 yuan account for 51.5%. Since most of the surveyed people are students, the number of tourists with a monthly income of less than 2,000 yuan is more in line with the current living expenses of students. The tourists with an income of 2000-4500 yuan accounted for 26.3%, 4500-6000 yuan accounted for 12.5%, 12 have a monthly income of 6000-10000 yuan, and 4 have a monthly income of more than 10000 yuan.

4.2. Validity and Reliability Analysis

KMO and Bartlett test were used to test the validity of the sample data. The KMO value was 0.870 and Bartlett test p value was less than 0.05, which indicated that the sample data were suitable for factor analysis. Through reliability analysis, it was found that the Cronbach alpha coefficient of emotional experience, aesthetic experience and entertainment experience were 0.758 0.703 0.712 respectively, and the overall Cronbach alpha coefficient of the three factors was 0.853, which indicated that there is credibility and consistency within and among the factors.

4.3. Factor Analysis

Factor analysis was carried out on the questionnaire data, and three common factors were extracted (Table2). The total variance was interpreted as 60.591%, and the load of other factors were all higher than 0.5 except that the load of question A4 was slightly lower than 0.5.

Table2. The component matrix after rotation

Items	Component		
	1	2	3
A1	.768		
A2	.707		
A3	.733		
A4	.459		
B1		.677	
B2		.788	
B3		.734	
C1			.547
C2			.587
C3			.809
C4			.623

4.4. Regression Analysis

4.4.1. Regression Analysis of Augmented Reality Project Experience Dimension on Tourist Satisfaction

The regression analysis results (Table3) showed that the adjusted R² is 0.225, which indicated that the regression equation fitting between augmented reality project experience and tourists' satisfaction was just common level, and other dimensions would have an impact on tourists' satisfaction. However, this study only analyzes from three dimensions: aesthetic experience, emotional experience and entertainment physical experience. The F value was 19.694, and the significant p value was 0.00, which indicated that the regression equation was significant. Among them, the significant P values of the regression coefficients of the three dimensions were 0.031, 0.032 and 0.005 respectively, indicating that the regression coefficients were significant. The regression coefficient of aesthetic experience is 0.162, emotional experience is 0.172, and experience is 0.224, which indicated that the experience dimension of augmented reality project has a significant positive impact on tourists' satisfaction, among which the entertainment experience has the greatest impact.

Table 3. Regression analysis of augmented reality project experience on tourists' satisfaction

Measure dimensionality	Unstd. Coeff.	Std. coeff.	t	Sig.
(Constants)	1.448		4.812	0.000
Emotional experience	0.172	0.184	2.176	0.031
Aesthetic experience	0.162	0.164	2.156	0.032
Entertainment experience	0.224	0.229	2.809	0.005
R ² =0.237 , adjusted R ² =0.225 , F=19.694 , P=0.000				

4.4.2. Regression Analysis of Augmented Reality Project Experience Dimension on Tourists' Behavioral Intention

Regression analysis was conducted to study the influence degree of augmented reality project experience dimension on tourists' behavioral intention. F value was 45.936, and the corresponding significance P value was 0.00, which indicated that the regression equation was of high significance. The regression coefficient of augmented reality project experience dimension was significant. The regression coefficient of aesthetic experience is 0.164, emotional experience is 0.268, and entertainment experience is 0.338. All three dimensions had positive significant impact on tourists' behavior intention, that is, the augmented reality project experience dimension had a positive significant impact on tourists' behavioral intention. (Table4)

Table 4. Regression analysis of augmented reality project experience on tourists' behavioral intention

Measure dimensionality	Unstd. Coeff.	Std. coeff.	t	Sig.
(Constants)	0.886		3.222	0.002
Emotional experience	0.268	0.273	3.707	0.000
Aesthetic experience	0.164	0.164	2.399	0.017
Entertainment experience	0.338	0.330	4.648	0.000
R ² =0.420 , adjusted R ² =0.411 , F=45.936 , P=0.000				

5. CONCLUSION

5.1. Research Conclusions

Based on literature review and questionnaire survey, this study attributed three dimensions of augmented reality technology on tourist experience through factor analysis, namely emotional experience, aesthetic experience and entertainment experience. From the perspective of emotional experience, tourists inclined to see the interest of AR tourism products, the immersion of the content, so as to get the sense of satisfaction, as well as the unforgettable experience that were different from other tourism products. In terms of aesthetic experience, AR tourism products created a three-dimensional sense of virtual pictures visually, so that tourists could be immersed in the scene of AR tourism products. In addition, the layout design of the scene should also make tourists feel vivid and pleasant. In the process of experience, most tourists hoped that AR tourism products could make them relaxed and feel

comfortable when they enjoyed the atmosphere of the performance project. At the same time, the wearable devices of AR tourism products should also make tourists feel comfortable in the process of experience, so that tourists could get entertainment experience from AR tourism products. Moreover, the three dimensions of emotional experience, aesthetic experience and entertainment experience had significant positive impact on the overall satisfaction and behavioral intention of tourists.

5.2. Recommendations

5.2.1. Enhance Tourists' Entertainment Experience

According to the participation of tourists in the process of playing, the entertainment experience can be divided into two types. The first is ornamental entertainment, which is just watching some entertainment activities to get pleasure from it, the second is participatory entertainment, which is to participate in entertainment activities and interact with each other to produce a sense of pleasure. The real-time interaction of augmented reality technology can enhance tourists' experience in vision, interaction and immersion. Therefore, AR tourism products should fully reflect the characteristics of augmented reality technology in order to be unique, attractive, arouse tourists' curiosity and interest, interact, and be favored by tourists.

It is suggested that AR game should be used to show the traditional culture in eastern mythologies of Xiamen Fantawild Dreamland. AR technology and real scene could be used to simulate the situation. In this situation, tourists could understand the traditional culture by means of breakthrough, question and answer, role play, or interaction with virtual characters to get the feeling as if they were in the situation.

5.2.2. Enhance Tourists' Emotional Experience

When designing tourism products, designer should not only meet the needs of tourists in terms of functions, but also consider the emotional demands of tourists, stimulate the release of tourists' emotions, arouse the resonance between tourists and tourism products, and thus affect the emotional experience of tourists. For tourism products, the design and development of derivative products could not only spread and promote tourism products, but also enhance the emotional experience of tourists. The development and design of derivative products could highlight the characteristics of tourism products or gave special cultural connotations.

In order to highlight the features of augmented reality technology and enhance the emotional connotation of AR tourism products, AR derivative products, such as AR postcards, should be designed and

developed. Taking the project of 'Liang Shanbo and Zhu Yingtai' of Xiamen Fantawild Dreamland as an example, the traditional story could be made into the cover of AR postcard with implanting augmented reality in the postcard. The content of the performance project, such as the fragments of the performance and introduction, would be watched through scan the QR code on the postcard, 3D, audio and other methods. It was a kind of emotional sustenance for tourists to recall the good memories of watching through postcards after leaving the scenic area.

5.2.3. Meet the Aesthetic Experience of Tourists

Aesthetic experience should give full play to tourists' perception and understanding of aesthetic objects in terms of imagination, emotion and association, etc. Therefore, tourists' beautiful perception should be reflected in the space scene design of tourism products. The three-dimensional space features of augmented reality technology indicated that the layout of scenic spots was the key point of AR tourism product innovation in terms of spatial processing, which could expand the perception dimension of tourists. In tourist attractions, tourists would get the scene information of performance items through their own senses and receive the content expressed by the performance items. Therefore, a good tourist scene could give tourists a good perception impression. In the design of tourism products, enhancing tourists' sensory experience, stimulating tourists' interest and improving tourists' perception of AR technology could affect tourists' evaluation of tourism products. Tourism enterprises should sublimate the scene layout of AR tourism products, add rich elements in line with the theme and give tourists more real and illusory experience in space could give tourists real perception. For the design of AR tourism products, designers should highlight the differences between AR tourism products and ordinary tourism products in context, content, modeling, such as color matching, modeling art, three-dimensional space, which could stimulate tourists' aesthetic perception of AR tourism products and bring tourists a sense of beauty.

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